COAL AGE

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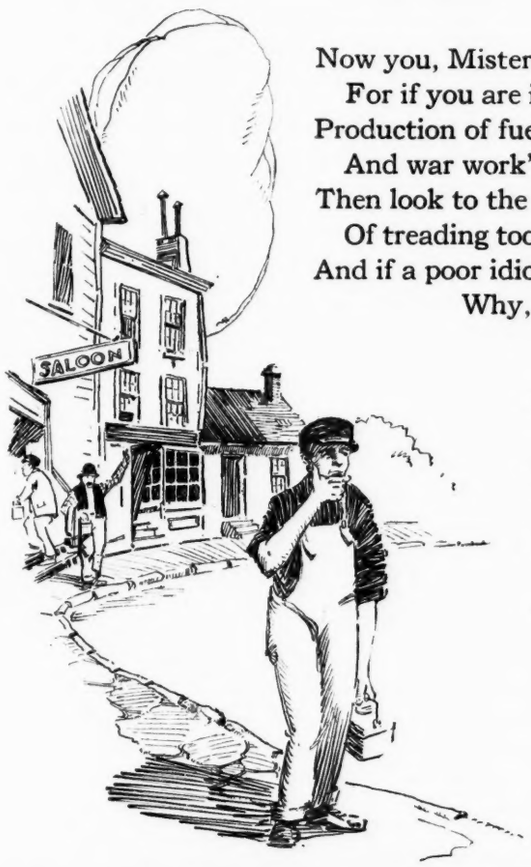
Think, Man, Think!

by Rufus T. Strohm

Written Expressly for Coal Age

So keen was the doughboy who went "over there,"
So hell-bent on chasing the Hun out of France,
That Tommy and Poilu were filled with despair
In trying to wean him from taking a chance;
"You're out of the scrap if you're wounded," they said,
"And too many dead put success on the blink;
So stop, when you're tempted to stick up your head,
And think, man, think!"



Now you, Mister Miner, your case is the same,
For if you are injured or if you are killed,
Production of fuel goes halting and lame
And war work's delayed while the job is unfilled;
Then look to the doughboy and learn to beware
Of treading too close to the dangerous brink,
And if a poor idiot flings you a dare,
Why, think, man, think

Fight shy of the perils in practical jokes,
Like jarring a chap with a shot of the "juice,"
For man-power's needed, and sensible folks
May think you're a dangerous fool to run loose;
And if on your way to the work at the mine
Your pals turn aside for a sociable drink,
And urge you to join them at Bacchus's shrine,
Then think, man, think!

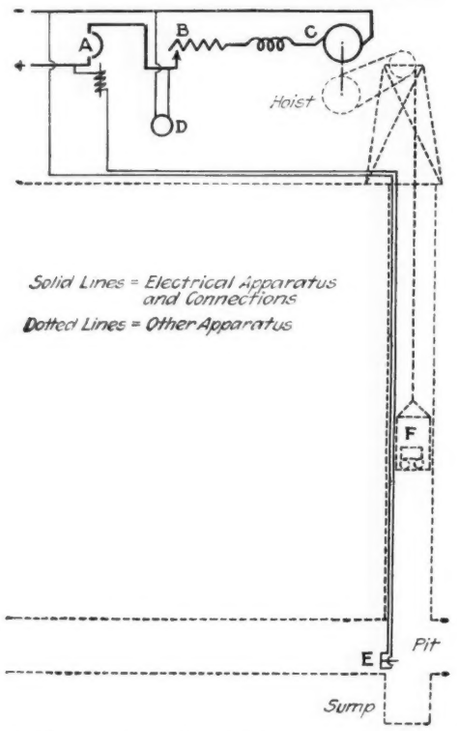
IDEAS AND SUGGESTIONS

Safety on an Electric Hoist

By R. J. CALLOWAY
Chicago, Ill.

A large number of the accidents that occur in coal mines arise from careless handling of the cages. I know of three fatalities in a certain Illinois mine due to a misunderstanding of signals between the cager on the bottom and the hoisting engineer on top.

The electric hoist is being used more extensively than ever before, and the safety device proposed in this



ELECTRICAL CONNECTIONS TO THE HOIST

article could be employed quite readily with this type of lift. Manifestly, any scheme tending to promote safety in the handling of cages must place the control of the circuit supplying power in the hands of the cagers themselves. They are the workers who will suffer injury in case the hoist is operated at the wrong time.

The plan suggested may be understood by referring to the accompanying diagram. The hoist in this instance is shown connected to a series motor, although the scheme could be applied to other types. One leg of the circuit runs through the contactor *A*. This contactor should be located in a locked compartment so that it cannot be tampered with. From the contactor the current goes in turn to the controller *B*, the motor *C* and thence to the negative side of the circuit. A pilot lamp *D* is connected across the circuit just ahead of the controller. The control circuit of the contactor is carried down into the pit to the mechanical trip switch *E*.

The operation is as follows: The cage *F*, descending the mine shaft trips out the switch *E* just as it reaches the bottom. This opens the contactor *A*, removing the power from the motor circuit. When the cagers have completed their operations they close switch *E* manually. The contactor *A* then closes automatically, restoring power on the motor circuit and lighting the pilot lamp *D*. The lighting of this lamp is a signal to the operator to hoist. In case the control circuit of the contactor accidentally becomes broken, the power is of course automatically cut off, preventing operation.

Other schemes have been proposed to eliminate the hazards of caging. One plan contemplated loading coal onto the cages at the bottom by gravity much in the same manner as it is removed from the cages at the top. This, however, would in most cases involve a new and expensive form of entry work, and, so far as I am aware, has not been extensively tried out.

"Balance"

By Western Manager

Man at his best in many ways resembles a machine, and like a machine he has a tendency to become erratic under certain circumstances. The human brain acts not only as a storehouse in which should be neatly pigeonholed and ready for instant reference facts gained by personal experience and observation, but as a governor or balance which, when properly operating, should control the conscious actions of the entire mechanism.

Who has not seen an engine damaged or wrecked by the failure of the governor to act during some emergency? Likewise, who has not seen some man's entire future either seriously impaired or rendered absolutely valueless by the failure of his brain, or balancing mechanism, to slow down his actions under excessive internal pressure or outward stress.

The engine governor is constructed to work under a certain maximum pressure, either high or low, and when that maximum is exceeded the governor either slows the engine down or disaster results; and so it seems is the human brain constructed. Some individuals are endowed with high-pressure governing centers which permit of a wide range of control, while others are not so fortunate and seem to have a definite limit, beyond which it is not safe to force them.

Balance is the secret of success; it is known also as horse-sense, and no man without it has ever advanced very far. A man may be highly educated, gifted in his particular line of endeavor, and experienced in the details of his business, but owing to lack of balance he may never advance beyond a subordinate position, while another man, possibly a classmate, who was never noted as a student, may reach the pinnacle of success with no apparent effort. He, however, had balance.

Many a good mine foreman has been spoiled by promotion to a superintendency which he was not mentally attuned to hold. The pressure was too high for his governing faculties, and under the stress he, figuratively, blew up.

Numerous examples could be cited, many of them concrete, of men, who while making an undisputed success in subordinate positions proved egregious failures when promoted, notwithstanding the fact that they may have had the necessary educational training and experience to fit them for the higher position. They were lacking, however, in one essential qualification which sadly cannot be attained by either study or experience.

The higher official, when seeking a man to fill a vacancy, is often hard put to find a man having the requisite qualifications of experience, theory and balance, and the last of these is the most unusual. The subordinate who is passed over may feel that he has been treated unjustly, when actually the boss, with his greater experience and wider range of vision, has done him a signal favor by preventing him from making a failure which might affect his whole future.

It is true that numerous individuals, like some engines, run along for years without any obvious balance or control, but sooner or later they reach the scrap heap. The really big men of any industry are those who possess temperaments balanced to the finest point, and with a wide range of adjustment.

Practical Signal System on a Mine Slope

By C. G. Brehm
Oliver, Penn.

In a certain mine the coal is delivered to the shaft, from a higher level, by a dilly trip, on a slope. On the surface there is provided a 150-hp. three-phase, 60-cycle, 440-volt motor, from which a rope descends a borehole and passes around a bull wheel, to pull the empties up the slope to the different landings and

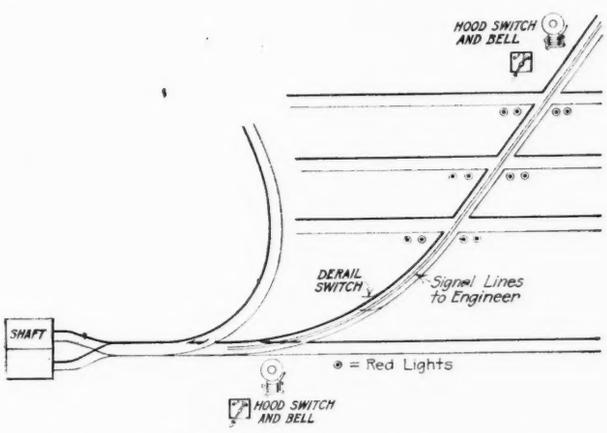
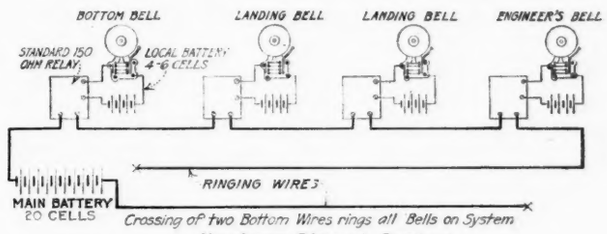


FIG. 1. DIAGRAM OF SAFETY SIGNAL INSTALLATION

to let the loads down. The length of the haul is about one mile each way, and the loads develop considerable speed in being dropped to the shaft bottom. Throughout the length of the slope is provided a signal line to the engineer. This the rope rider uses for starting and stopping.

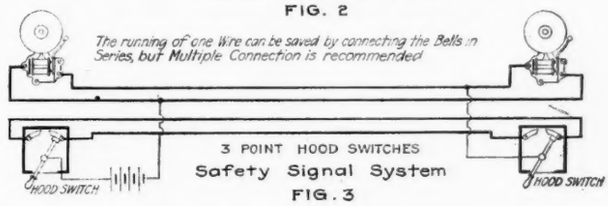
Several flats cross this slope, on which drivers are continually working, and as this system was being installed the possibility of accidents on these crossings presented itself. Another danger was also apparent, arising from the possibility of the rope or hitching breaking and allowing the loads to come into the bottom uncontrolled.

In an effort to minimize this danger and also safeguard the drivers at the crossings a system of electric danger lights and signals were installed as shown in Fig. 1. A derail switch was provided on the slope, near the shaft bottom, which normally remains open. On the slope, about 1000 ft. from the bottom, is placed a three-point hood switch and bell connected to a similar



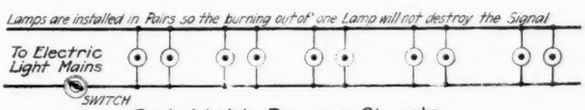
Haulage Signal System

FIG. 2


The running of one Wire can be saved by connecting the Bells in Series, but Multiple Connection is recommended
3 POINT HOOD SWITCHES
HOOD SWITCH
HOOD SWITCH

Safety Signal System

FIG. 3



Red Light Danger Signals

FIG. 4

FIGS. 2 TO 4. DETAILS OF THE WIRING SYSTEM

set at the bottom. There is also provided at each crossing red lights, which are lighted by the bottom man when a trip approaches.

The rope rider, on coming down the slope, throws his hood switch, and because of the presence of the bell knows if the bottom man is receiving the signal. In case his bell did not ring he would know that the signals were not working and would stop the trip by signal to the engineer. The hood switch bell on the slope, as well as the one on the bottom, will continue to ring until the bottom man throws his hood switch. The bottom man, upon receiving the signal of an approaching trip from the rope rider, snaps on the red lights for the crossings, closes the derail switch, and the trip is safely landed at the bottom.

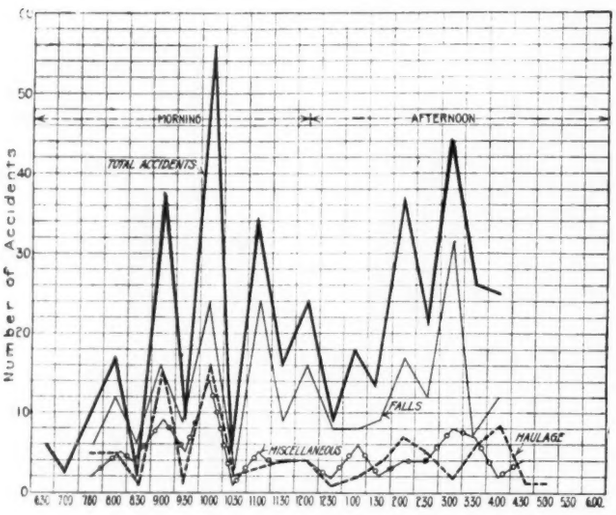
If for any reason, such as the breaking of the rope or hitching, the trip was to run away, a special signal call on the engineer's lines would warn the bottom man and the crossings would be protected by the red lights while the trip would be derailed at the switch. This system has been in operation for several years and has given perfect satisfaction. Details of the wiring are shown in Figs. 2, 3 and 4. No doubt such a signal system, or a modification thereof, can be used to great advantage in many mines.

Who Gets Hurt and When?

SYNOPSIS — Gives details, which have long been desired, relative to the distribution of mine accidents. In the Ellsworth mines Mondays and Tuesdays, ten o'clock and three o'clock, July and August, the third and fourth years of experience and ages over 47 seem to mark points of greatest accident hazard. Most of these dangers could be reduced if appropriate steps were taken by the employee.

THE Ellsworth Collieries Co., of which E. E. Bach is sociological director, not only notes how its men get hurt also when the accidents occur. It further records how long the men have been engaged in mining work and how old they are; in short, it ascertains: Who gets hurt and when?

Some people say that men get hurt when they are tired; others say they get hurt when they are sleepy, after long hours, a heavy meal or a midday schooner of ale; some say they are hurt because they drink over much on Saturday and Sunday and do not have full control of their faculties on Monday and Tuesday, and

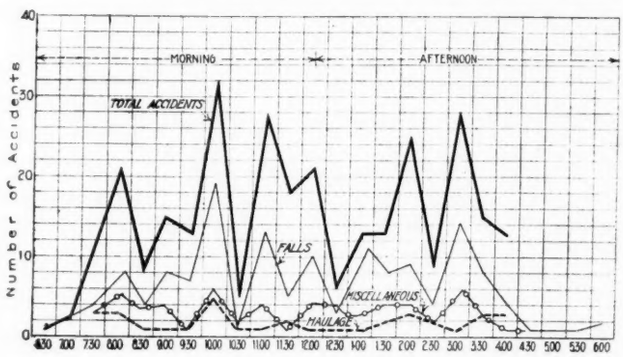


ELLSWORTH CASUALTIES IN 1916, CHARTED ACCORDING TO HOURS OF OCCURRENCE

so forth. Statistics do not prove much, but they at least give indications which a wise man will heed.

The Ellsworth Collieries Co. has fortunately had an entire freedom from catastrophic accidents since the beginning of its observations in 1911 and before. The figures and charts therefore do not need any revision to eliminate such general accidents. Two charts here presented show the number of accidents in each half hour of the day with reference to falls, haulage and miscellaneous hazards. The charts also show how the total accident rate varies with the half hours of the day. Apparently the early part of the morning is comparatively free from accidents. Ten and three o'clock seem to have been in both 1916 and 1917 the moments of greatest danger. It is natural to ask: Are these the hours of fatigue of the morning and evening? or, "Are there other causes for the frequency of accidents at these hours?"

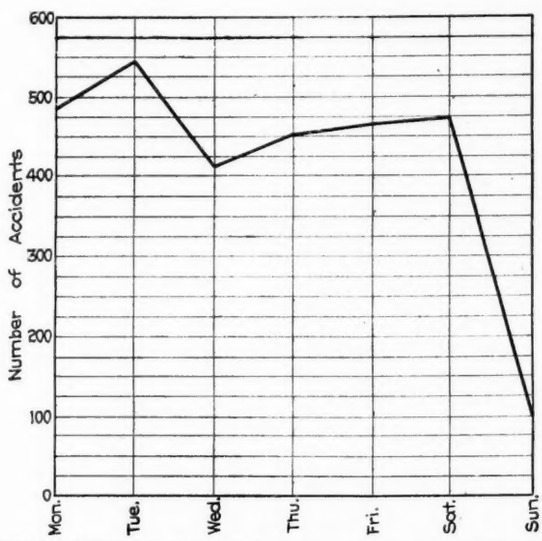
It is interesting to note that the men are still menaced by rock falls at as late an hour as 3 p.m., for the rate reaches one of its two peaks at that hour. The Ellsworth men must stay perseveringly at their work or the inherent danger of the mine face must be pecu-



ELLSWORTH CASUALTIES IN 1917, CHARTED ACCORDING TO HOURS OF OCCURRENCE

liarly severe at that time. Probably it is the absence of the men from work that accounts for the lower peak in the accident rate at 3 p.m. than at 10 a.m. It is interesting to note that in both 1916 and 1917 the haulage risks were at a minimum at 3 p.m. whereas the miscellaneous risk and the risk from falls was at a high point.

It must be remembered that at these mines shotfirers are employed, but they shoot the coal during working hours, and the progress of shooting may have something to do with the distribution of the accident frequency



ELLSWORTH CASUALTIES, 1911 TO 1917 INCLUSIVE, CHARTED BY DAYS OF WEEK

from falls of coal and roof. It will be noted from a table and a chart accompanying this article that Tuesday is the day with the greatest number of accidents and Monday is the next worst day. One does not know how many men would be killed if the Sunday "drunks" reported for work on Monday, though perhaps this sug-

ACCIDENTS DISTRIBUTED ACCORDING TO DAYS OF OCCURRENCE

Year	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Tota
1911	59	79	62	78	72	59	21	430
1912	56	72	59	52	53	77	38	407
1913	79	81	70	48	84	83	8	453
1914	63	73	42	46	67	32	2	325
1915	65	94	55	70	56	77	13	430
1916	103	77	81	103	69	80	8	521
1917	62	67	45	54	63	66	12	369
Total	487	543	414	451	464	474	102	2,935

ACCIDENTS DISTRIBUTED ACCORDING TO MONTHS OF OCCURRENCE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1911	37	30	32	24	34	18	32	60	40	36	37	50	430
1912	50	43	34	11	41	30	23	44	27	44	30	30	407
1913	39	27	42	43	28	51	55	31	55	43	28	11	453
1914	8	24	33	20	28	37	44	31	32	34	13	21	325
1915	21	24	27	34	39	52	52	29	41	39	43	29	430
1916	55	75	55	25	32	32	63	40	42	28	44	30	521
1917	33	35	33	26	23	33	33	33	21	40	37	22	369
Total	243	258	256	183	225	253	302	268	258	264	232	193	2,935

ACCIDENTS DISTRIBUTED ACCORDING TO OCCUPATIONS

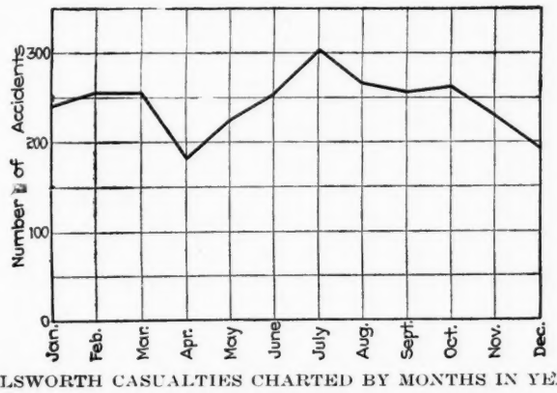
	1913	1914	1915	1916	1917	Total
Loader	19	12	20	175	148	374
Digger	12	27	20	104	73	236
Snapper	45	42	37	18	27	159
Laborer	47	25	33	17	15	137
Machineman	43	41	31	6	33	154
Motorman	30	17	13	18	14	92
Tracklayer	22	30	12	0	0	64
Shotfirers	44	5	11	0	4	64
Trapper	35	7	13	0	0	55
Pumper	5	2	12	2	0	21
Timberman	25	9	12	9	15	70

TONS MINED PER FATAL ACCIDENT

Year	Fatal Accidents	Tons Coal Mined	Tons Coal per Fatality
1907	9	1,278,122	142,013
1908	24	1,134,947	48,122
1909	7	1,122,384	174,626
1910	11	1,518,212	138,019
1911	10	1,375,475	137,547
1912	10	1,400,163	140,016
1913	8	1,627,058	203,382
1914	5	1,200,427	240,085
1915	8	1,722,542	215,317
1916	3	1,480,630	493,543
1917	10	2,050,820	205,082

gestion is not fair. It would take a clearer case than is shown to justify the connecting of the larger fatality risk of Tuesday and Monday with the hebdomadal inebriety of mining towns. It may be said that the Ellsworth Collieries Co. village is without a saloon, but just outside liquor is extensively sold, and the wholesalers, much to the regret of the company, do a large trade in the town itself.

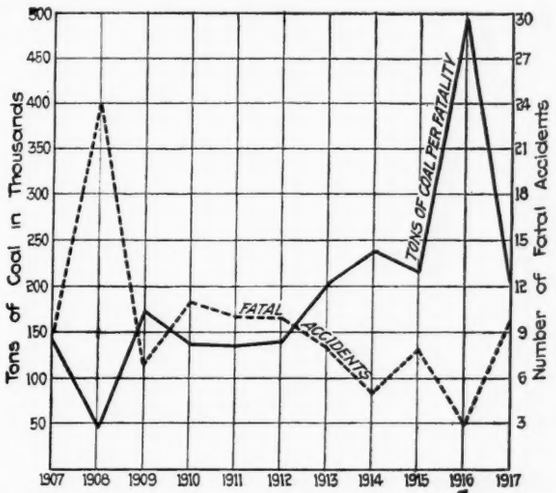
Another table and chart show that July and August have the greatest accident frequency. It is doubtful whether much can be determined from this information without a segregation of the accidents of mine workers and day hands and without some information as to the number of days worked in each month in the years under consideration. The Ellsworth Collieries Co. works more steadily than many others, and being the adjunct of a steel plant and having coke ovens, its operation is doubtless more evenly balanced throughout the year than is the operation of most mines, but still it is not safe to assume an equality of operation



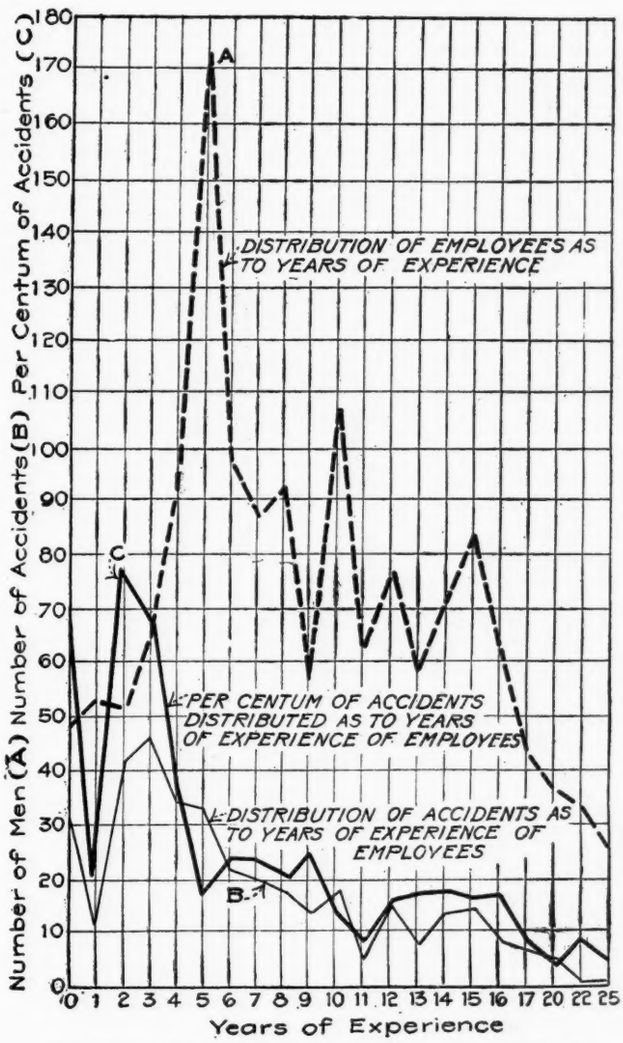
ELLSWORTH CASUALTIES CHARTED BY MONTHS IN YEAR

month by month; in fact the summer months were probably the least active and yet had the greater number of accidents.

The distribution of accidents by occupations is interesting but without a table showing the number of


Tons of Coal in Thousands
Number of Fatal Accidents
TONS OF COAL PER FATALITY
FATAL ACCIDENTS
1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917

ELLSWORTH FATALITIES AND TONS PER FATALITY FROM 1907 TO 1917

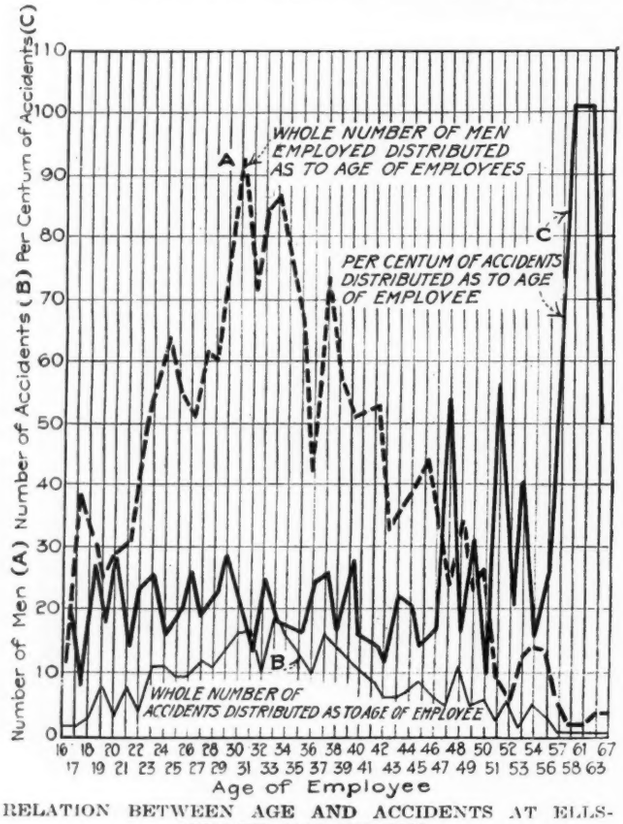

Number of Men (A) Number of Accidents (B) Per Centum of Accidents (C)
DISTRIBUTION OF EMPLOYEES AS TO YEARS OF EXPERIENCE
PER CENTUM OF ACCIDENTS DISTRIBUTED AS TO YEARS OF EXPERIENCE OF EMPLOYEES
DISTRIBUTION OF ACCIDENTS AS TO YEARS OF EXPERIENCE OF EMPLOYEES
A
B
C
Years of Experience

RELATION BETWEEN EXPERIENCE AND RISK AT ELLSWORTH, 1916 TO 1917

men engaged at the various kinds of work thus listed it is impossible to draw any conclusions except perhaps that the snapper and in less degree the motorman, like the train hand on the railroad, is exposed to the worst of all conditions. The danger from mine cars continually grows with the increased speed and increased length of trips. If anything goes wrong with the snapper in the rear of the trip, the motorman knows nothing of it as the noise of the trip and the distance between these two coworkers make it impossible for them to keep in touch.

The record of tons per fatal accident shows remarkable improvement until 1917 when the record falls to the level of 1913. In most mines 1917 was a year of increased fatality per ton of coal, the increase arising apparently from the hurry with which the work was performed.

One interesting chart shows the distribution of accidents with years of experience of the employee, how


Number of Men (A) Number of Accidents (B) Per Centum of Accidents (C)
WHOLE NUMBER OF MEN EMPLOYED DISTRIBUTED AS TO AGE OF EMPLOYEES
PER CENTUM OF ACCIDENTS DISTRIBUTED AS TO AGE OF EMPLOYEE
WHOLE NUMBER OF ACCIDENTS DISTRIBUTED AS TO AGE OF EMPLOYEE
A
B
C
0 10 20 30 40 50 60 70 80 90 100 110
16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 57 61 67
17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 56 58 63
Age of Employee

RELATION BETWEEN AGE AND ACCIDENTS AT ELLSWORTH, 1916 AND 1917

many employees there are with a given number of years of experience and the relation between accidents and men employed for any given number of years of experience. It seems to show that the greenhorn with less than a year's experience is a poor risk. Experience and observation seem to improve him and when he has been between a year and two years at the work he is a fairly safe employee.

But the third year ushers in a period of risk taking. He appears to have become sure that the dangers will "never get him" and as a result he is "frequent deceased" after two years' experience. Gradually he appears to learn better. In the "5-plus" year he has become a "safety fan." He no longer believes in tempting Providence. Though there are wriggles in the percentage curve thereafter, on the whole it is a descending curve to the last.

All this is very consoling. It shows it is easy to teach safety to the greenhorn and it proves that the older men are willing to stay taught. But in between there is a peak exhibiting a disposition in the new man to "sow his wild oats in the safety field." This disposition can surely be eliminated by suitable safety propaganda.

The thorough investigation of the Ellsworth Collieries Co. seems to show that the old miner with his set ways is not the big offender. It is the young man with the wine of life in his veins and strength in his limbs who is willing to take and does take a chance, not because he is convinced that a certain course is safe enough but because he just delights to gamble with death as he likes to gamble with the contents of his pay envelope.

Let the young, inexperienced miner see that achieving safety is just as well worth while as playing with danger and he will become a safer employee. Every young man has ideals and works toward them. If they are ideals of foolhardy courage he will follow his ideals to his death. If they are ideals of safety and thrift, he will follow them through a long industrious life of good citizenship to an old age of comfort and honor.

An Iniquitous Custom

A criminal action was heard in the coal mining town of Fernie, B. C., recently which created something of a furor there and held the attention of coal mine operators and miners throughout the province. The circumstances, in a few words, were that a miner employed by the Crow's Nest Pass Coal Co. was accused of loading a number of cars and placing his tally check thereon while supposed to be on company work and paid by the company. Thus he got double pay—pay at the stated rate for company work and pay, under the contract system, for the coal loaded, which in the ordinary way was credited to him.

Witnesses for the defence testified in effect that it frequently happened, so frequently as to be almost a custom, that subofficials would allow contract miners, while working on company time, credit for coal loaded by them on contract basis in addition to the regular schedule for the company shift. It was alleged that the motive for this was to "speed up" operations by hastening the expeditious completion of necessary work and avoiding undue interference with production.

On the other hand company officials and subofficials entered an emphatic denial of the existence of such a system. The secretary of the local union declared that the practice was common but repudiated it, stating that it was not followed with the approval of union officials.

The Court in fining the accused $100 or six months in jail said: "If this custom did exist, it is a criminal one. I do not care if a few overmen or firebosses connived with the workmen; it was a criminal one undoubtedly. I do not share Mr. Phillips' (witness for the defence) Bolsheviki idea that it is all right to steal from your employer but not from your fellow worker. I do not think any right thinking man will agree. But, as I say, if it was a custom, it was a criminal one and one a man should be punished for."

Progress in Accident Prevention

What the National Safety Council Has Accomplished in Safeguarding the Workman—Nothing Can Be Achieved Without the Earnest Co-operation of the Workers Themselves—Education in Safety Should Begin in the Home—How the National Safety Council Has Grown

THE development of the science of accident prevention in America within the last five years has been summarized in a single phrase, "Nothing is so valuable economically as the man." Outlined briefly, the following have been found to be the essential features of accident prevention work:

1. To ascertain the actual conditions of risk under which employees perform each task and to determine the practical methods of eliminating or reducing this risk.

2. The provision of proper working conditions and of efficient safeguards for dangerous machinery and appliances.

3. Careful selection, instruction and supervision of workmen, and their assignment to work for which they are best suited.

4. The promulgation and rigid enforcement of necessary rules for safeguarding.

5. The inculcation of habits of caution in the minds of all concerned.

Actual conditions of risk, five years ago, were usually summarized as follows: Industrial accidents, fatal, one every four minutes; non-fatal, one every four seconds. Only male workmen were taken into account and no reference was made to the many women and minors engaged—probably because no statistics were available. Elimination of risk has not been achieved or even approached, but a start has been made, approximating reductions of 15 per cent. in fatal and 40 per cent. in non-fatal industrial mishaps. Members of the National Safety Council who have carefully compiled statistics covering the five-year period report even more satisfactory totals, a few declaring reductions for both fatal and non-fatal classifications of 65 to 85 per cent.

The attempted achievement of proper working conditions and the standardizing of safeguards on dangerous machinery and appliances have revolutionized modern industrial methods, particularly when applied to plants engaged in "quantity production." Starting with the fundamental principle of installing only safe machinery and equipment, plant managers demand of machine builders that every guard of known merit shall be incorporated in the design of the machine. In the present day workshop the executive strives to embody in every operation, beginning in the drafting and planning departments, provisions for safeguarding his workmen. The purchaser of a crane, for example, can now secure a completely appointed device—fully as efficient as any previous model, plus a full complement of guards.

Manufacturers of woodworking devices have gone further, probably, than any other group of machinery designers, and shapers, jointers, saws and planers are usually fully protected. The same may be said, varying only in degree, for the manufacturers of lathes, cutting, stamping and boring machines commonly found in workshops of every character. In the operation of such machinery, however, plant executives, even through the most careful supervision, have not succeeded in achieving entire elimination of work accidents.

In older installations the safety engineer and department foremen are relied on to design and fabricate most of the guards. Certain large industries have systematized the designing, building and installation of guarding devices by turning the work over to a special department, and men engaged in this work are not called upon to take part in production. Remarkable results have been achieved, but as yet, although records in accident prevention show reductions of 85 per cent., no safeguard, however elaborate in design and efficient in operation, is claimed to be "fool proof." Accidents still occur.

Careful selection, instruction and supervision of workmen and the assignment to them of work for which they are best suited may be said to start in the home rather than in the factory, workshop or mill. Education in safety begins with the parents, continues in the schoolroom, and finally reaches the employment manager or foreman.

A score of American cities have attempted civic safety work, notably Rochester, N. Y., where a campaign of education embracing every phase of home, street, public and industrial accident prevention is being carried on. Thousands of educational bulletins, changed weekly, have been printed and displayed, and the lessons have proved of intense interest. Scenes familiar to every citizen of Rochester have been utilized to drive the lesson home, and it is a safe prediction that the campaign will prove of lasting benefit.

Special series of safety bulletins are available for use in public schools, and in many communities these are proving valuable aids to teachers in safeguarding pupils to and from their homes. Primary lessons in crossing streets, avoidance of traffic accidents, safety at play and in the home are taught in the lower grades, while in the advanced grades more comprehensive lessons are offered.

Carrying the idea to a logical conclusion a national committee is now at work formulating a scientific course for students of technical schools and universities. The need for such a course is emphasized by the establishment in western Pennsylvania of a private course in safety engineering, under the auspices of a local branch of the National Safety Council, the industries being unable to secure a sufficient number of technically educated men to fill the positions awaiting such engineers.

Supervision, whether in production or in accident prevention, is one of the most important of industrial problems. In safety work it has often been said that "without the whole-hearted coöperation of the foreman all efforts in accident prevention must fail."

Adopting the experience of safety engineers it has been found advisable, if not imperative, to enlist the services of the general manager not only in enforcement

but in every stage of preliminary planning; this secured, the executive staff accepts as the policy of the establishment the slogan "Stop the Accidents," or as more popularly phrased, "Safety First."

The management, the planning staff and the foremen working in unison, the employment manager is next in line for conversion to the movement. This is well emphasized by the present plan in certain large industrial plants of charting every position in the works and the acceptances by the employment managers of partially incapacitated men or women for lighter service. The plan, too, has worked well in returning injured men to work. Men incapacitated because of injury to a lower extremity are found places where service may be performed while seated, as has been repeatedly proved to the satisfaction of both employer and employee.

The promulgation and rigid enforcement of necessary rules for safeguarding has worked out in actual practice to an advanced stage of mutual coöperation. Success in drafting shop rules for accident prevention has been attained when shop safety committeemen serve on boards organized for the formulation of accident prevention standards. In fact, next to the general manager and his superintendents, the members of the shop safety committee are the most valuable safety boosters in the plant.

Safety rules are often augmented by bonuses, prizes and rewards of various kinds, and these serve to inculcate the habit of caution in the minds of all concerned. That "the best safety device known is a careful man" is an aphorism of proved merit. Discipline has its value, but watchful care must be exercised to prevent foremen from confusing discipline with peevishness or "nagging" of workmen. Proneness to follow precedent in operation, while excellent in maintaining discipline of a sort, is destructive to best results in safety work—change of process, equipment and operation calls for complete revision of method, and gradually habits of personal caution and thinking observance of safety standards are revising experience tables of lost-time mishaps in the industries of the country.

History of the National Safety Council

ON SEPT. 20, 1912, the Association of Iron and Steel Electrical Engineers met in the city of Milwaukee and following the report of the Committee on Accident Prevention, resolved to launch a national coöperative movement for the dissemination of policies and methods worked out in the steel industry and found effective in reducing the number and severity of industrial accidents.

Forty delegates attended the First Safety Congress, meeting jointly with the Iron and Steel Electrical Engineers. An outline of procedure was adopted, together with a constitution and by-laws, and the work of scientific accident prevention became an integral part of American industrial life. Federal and state officials were in attendance and took active interest in the work. After several days of discussion and careful planning, a central body was established known as the National Council for Industrial Safety. For convenience of classification, departments were established to popularize and further the movement, and the close of the Congress found the organization ready to take up safety work in the mining industry, on the railroads, in manufacturing and among iron and steel companies.

The new organization grew and prospered. A weekly safety bulletin service was established and has continued without a break for more than four years, growing to a distribution of 75,000 copies per week. Statistical researches were made and tabulated, and practical value given to shop activities. The innovation of using available data in the simple and effective form of one-page illustrated bulletins, rather than in the compilation of massive treatises, proved the value of the Council's services in presenting the lessons in readable form, fresh from the press. The Council doubled its membership and greatly increased its usefulness in the second year.

The Third Safety Congress was held at the Hotel LaSalle, Chicago. This series of meetings was epoch making, both in attendance and interest; it was at this Congress that the industrial medical practitioner first made his voice heard. Plant managers learned that the installation of adequate mechanical safeguards did not comprise their entire duty. Sanitation, ventilation, control and eradication of industrial disease, elimination of infections—all these and other questions were placed on the program and thoroughly discussed. Tuberculosis, blood poison, hernia, eye strain and excessive fatigue were handled in a way to awaken the interest and cooperation of the large audiences.

A year of intense activity followed. With a broadened scope of activities the association changed its name to the "National Safety Council." The program of the Third Safety Congress furnished the text for the activities of the officers and members, and the work was carried on with renewed enthusiasm. The membership doubled, and with every mail came scores of experience statements from plant officials. These were compiled, digested and reissued for the information of the whole membership. It is significant of the interest taken in the work that the master minds of industry have cheerfully and unostentatiously given so liberally of their time and experience for the causes of safety and humanity.

The Fourth Safety Congress was held at the Bellevue-Stratford Hotel, Philadelphia. To meet the demands of the Congress it was necessary to again divide the Council into new sections, each group meeting being larger in attendance and more ambitious in program than the first congress at Milwaukee. The Governor of Pennsylvania, the mayor of Philadelphia, the press and the public united to further the propaganda of the congress.

After the preliminary "round table" gatherings, devoted to general discussion, ten sectional meetings considered the particular safety problems of their industries. The Cement Section took a leading part in the congress, as did the Mining, Steam Railroad, Laundry, Paper and Pulp Manufacturers, Public Utilities, Textile, Industrial Hygiene, Safeguarding of Machinery, Foundry and Woodworking Sections.

It was at this gathering that the greatest truth in the safety crusade was forcibly driven home to plant managers, safety engineers and the public: That all the safeguards, all the rule books, all the discipline, and all other efforts must fail without the earnest and willing coöperation of the workmen themselves. Millions of dollars had been expended by members of the National Safety Council in perfecting mechanical safeguards in their plants; other millions went for sanitation, for ventilation, for preventive measures, yet the men vitally affected too often showed only a perfunctory interest in their own welfare.

A score of addresses and lectures were delivered at the Philadelphia Safety Congress, pointing the way to success in administering safety work—the way to the hearts of the millions of men and women toiling in the industries. The visiting nurse, the industrial physician, the dentist and the teacher came forward and joined the employer, social worker, priest and parson in teaching applied and practical Christianity. Industrial justice was the keynote of the congress.

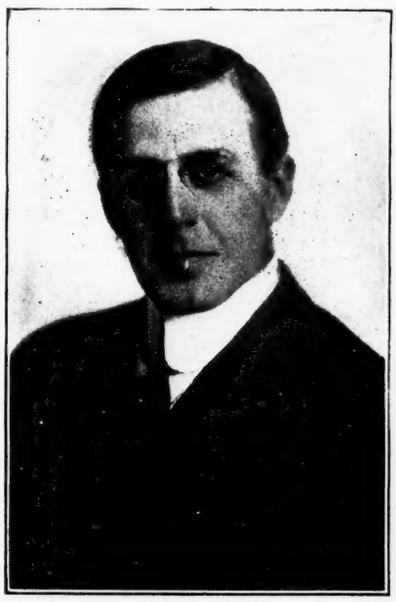
Another important lesson was gleaned from the wealth of digested experience and statistical data furnished through the medium of the parent body—the National Safety Council. Where one accident was prevented through safeguarding, three were prevented by the exercise of personal care and caution by the workmen themselves. Where one case of industrial disease was prevented in the shop or factory, two were susceptible of prevention and cure in the home life of employees.

From the time of the Fourth Safety Congress the importance of education, rather than compulsion, in safety matters, was given prominent place in the activities of the movement. The elasticity of safety work was never better exemplified than during the succeeding year. Employers who had held aloof, waiting for the movement to prove itself, came forward in whole-hearted recognition of the justness of the plea for a larger humanity. From an organization struggling to meet the patent demands made upon it in the simple necessities of every-day life, organized accident prevention, almost in a day, was placed beyond the need of financial worries.

From the Fourth to the Fifth Safety Congress the membership again doubled in number; the work of the sections was improved, an increased staff at headquarters facilitated the activities of the officers and the newer phases of safety work were pushed with unrelenting vigor.

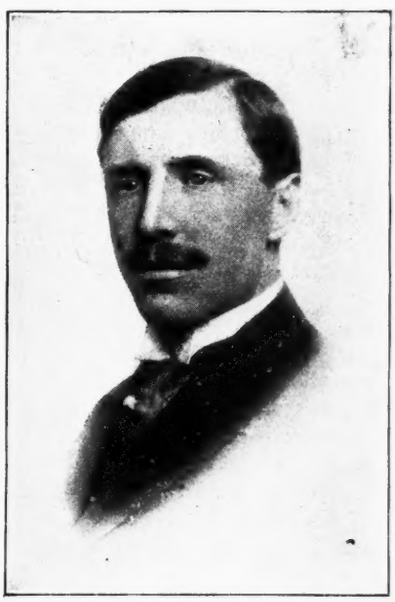
The Fifth Safety Congress was held at the Hotel Statler, Detroit, and the Sixth Congress at the Hotel Astor, New York City. Perhaps the most important contribution to the cause of safety during this period was the organization of an information bureau and library containing every scrap of printed material available, touching on the work of accident prevention. This information bureau, at present in charge of three trained librarians, classifies and files all available data, sending it to hundreds of inquirers every month. Among the duties of a staff of safety engineers is the classification and preparation of the material for suitable bulletins and publications for employers and safety engineers to properly start them in new activities. For the year ending Apr. 1, 1918, five million bulletins were distributed to fifteen thousand representatives scattered in all parts of the country.

During the year 1917 a monthly pamphlet, "Safe Practices," was born; this is an encyclopedic work destined to take its place in literature with the foremost handbooks of accident prevention. A modest number on "Ladders" was followed by others on "Stairs and Stairways"; "Boiler Rooms"; "Crane Construction and Safe Practices"; "Knots, Slings, Bonds and Hitches"; "Belt Shifters," etc. In time, it is intended to present every phase of industrial education, and by rule, illustration and practice complete a digest of safe practices for the prevention of accidents in every branch of industry.



DAVID VAN SCHAACK
President

S. J. WILLIAMS
Manager Accident Prevention Division



W. H. CAMERON
Manager, Secretary and Treasurer

MEN WHO HAVE GUIDED THE DESTINIES OF THE NATIONAL SAFETY COUNCIL DURING THE PAST YEAR

Y. M. C. A. Building vs. "Y. Hut"

By CHARLES F. WILLIS
Consulting Supervisor, Department of Industrial Relations, Phelps Dodge Corporation, Bisbee, Ariz.

Though the illustrations and story are based on the experience of a copper corporation, which is practically identical with the Stag Canon Fuel Co., a large coal-operating concern, the ideas given are quite applicable to coal mining. The article was prepared specially for us by the author.

A PROBLEM that is now being faced in many states of the union, and one which probably will soon be confronted all over the country, is how to replace saloons in mining and industrial communities by other places of entertainment. There have been many experiments along this line. Some believe that the motion-picture houses have already to a large extent replaced the saloon. Without a doubt, many who formerly were accustomed to loaf around saloons now attend motion picture houses, but these institutions are a partial substitute rather than a replacement.

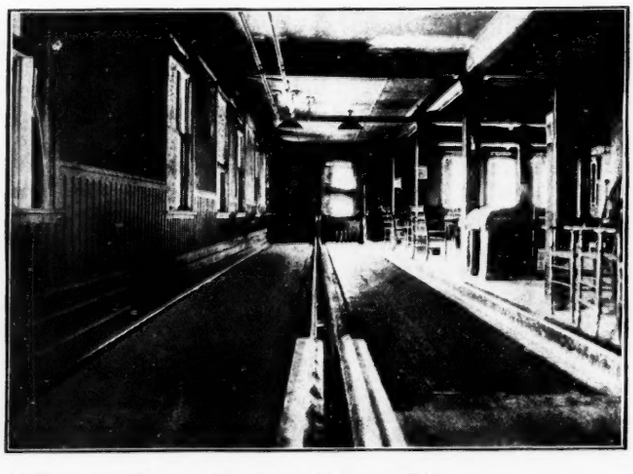
It is not a logical replacement in that it provides none of those things that made the saloon attractive as a place in which to spend one's leisure time. It is not natural for a man working underground in the semi-darkness and in a more or less close atmosphere to select similar conditions for his leisure hours. Recreation rightly understood involves a change of conditions from those obtaining during working hours.

Since the abolition of the saloon in "dry" states there have been many soft-drink parlors established—this being another method of replacing the saloon. While this is a more logical method of meeting the difficulty, these places of entertainment have not proved successful. As business ventures they have paid, but they have not supplied the element of sociability on which the saloon keeper of the past relied as a means of attracting customers. In a soft-drink parlor a man usually goes in, gets his drink and comes out, staying no longer than is absolutely necessary for that purpose.

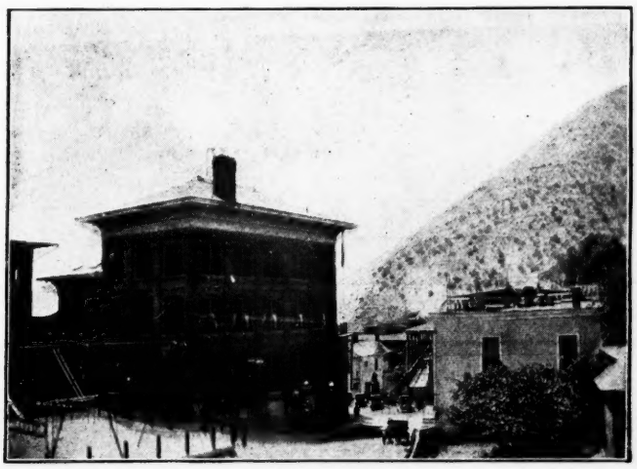
In certain mining communities there has been an attempt to replace the saloon by Y. M. C. A.'s, at which every conceivable equipment has been provided that in any way promised to furnish a substitute for the allurements of the saloon. There is grave doubt, however, that they reach the men who were accustomed to frequent the bar room.

Notable among the mining camp Y. M. C. A.'s is that provided by the Phelps Dodge Corporation at Bisbee, Ariz., where a fine building has been erected with practically everything in the line of "Y" equipment—pool tables, bowling alleys, swimming pool, gymnasium, motion pictures, educational classes, reading room with library and religious work. One might go through the entire list of Y. M. C. A. activities and find none of them missing in this organization. It has been remarkably successful, and now has some 1800 members, about 1000 of whom are miners, and the community has been much interested in its development. Its success has been apparent; it fills a place in this community that no other organization could fill, but there is again serious doubt that it actually replaces the saloon.

Another institution to replace the saloon is the employees' club, which is somewhat different in nature from the typical Y. M. C. A. The Morenci Club is an activity of this kind. It is also found at a village of one of the Phelps Dodge subsidiaries. A splendid building has been provided and the club serves as a recreational center for the people of the town. This organization is run partly as a business proposition; pool tables and bowling alleys are provided at about one-third the usual cost of these things; the best motion pictures are secured, even though it is done at a loss, for the company desires to educate the taste of the people for the best films. The club was designed to be a loafing place for all, irrespective of nationality or religion, to serve as a place where properly supervised entertainment could be obtained at a reasonable price. This institution also has a distinct place in the community, a definite need which it fills; but here again the question arises, "Is it actually replacing the saloon?"



MORENCI CLUB, MORENCI, ARIZ., AND A VIEW OF THE CLUB BOWLING ALLEYS



Y. M. C. A. AT BISBEE, ARIZ., BUILT BY PHELPS DODGE CORPORATION AT A COST OF $116,000; CLOSE UP OF ENTRANCE IS SHOWN ON RIGHT

It might be well here to analyze the saloon and the features of it that need replacement, to see whether or not the various substitutes do fulfill these needs. Saloons are usually placed conveniently to the homes of their prospective patrons; as the town grows, more are found, in locations convenient and easy of access. Comparatively few men go to a saloon primarily to drink. They go there because it is convenient, because it is a place where they will find congenial company, and they gather there in groups sufficiently small that all present may enter into close companionship.

They like the saloon because the equipment and the surroundings do not make them feel out of place, no matter how they may be dressed. They like its free and easy air. There are no restrictions; they can make all the noise they please or be quiet if they so desire. They buy drinks because they feel that it is only fair to the saloon keeper that they pay him something for using his building as a loafing place. This is not true in all cases, of course, but it is undoubtedly true of many persons. Many a man's first attraction to the saloon is the opportunity it affords to associate with the people who frequent it. It is only later that he gets the drinking habit and goes there for the express purpose of drinking.

Does the soft-drink parlor, the fine Y. M. C. A., or the commodious employees' club fulfill these conditions for the man who ordinarily used the saloon? As a rule these organizations are so large that intensive sociability is difficult. Yet they are not large enough to accommodate readily the many men who formerly used the saloon as a poor man's club. Y. M. C. A.'s and employees' club buildings are generally costly, it being the desire of the mining companies to erect something for their employees that is worth while. Fine lobbies, huge leather chairs and many luxuries are found, which are not a part of the saloon atmosphere or of any atmosphere to which the workman is accustomed. To make use of these places he instinctively feels that he has to don a white collar.

In most mining camps the working force is composed of men of many nationalities, and one saloon or another gradually becomes the loafing place for men of some one of the many nationalities represented. We find that there is little mixing between the people from different countries. In the case of the Y. M. C. A. or the employees' club, however, an attempt is made to mix these races. Moreover there may be but one, or there are, at best, but two Y. M. C. A.'s or clubs in a large community. If that community is not spread over a large area it is easy for every man to take advantage of the entertainment provided, but in many mining villages the distances are too great for that to be done. Men seek their social pleasures at the nearest point to be found, particularly after performing a hard day's work.

Now comes the question as to what features of the saloon can be provided, where they can be provided, and in what manner administered, so that they will reach the people whom the saloon is designed to accommodate. I believe that it is possible to supply everything that the saloon provided with the exception of alcoholic drinks, to provide them under some supervision and to give them all the features, with the exception of the bar, that has made the saloon attractive.

What is it, then, that draws men to the saloon? Bright lights, warmth and comfort, a building not so fine but what the workmen could feel at home, regardless of his dress, a place small enough for intimate social relations and a place convenient to his home. The saloon substitute will have to provide these, and an additional something to provide for the time which in the case of a saloon is spent at the bar.

May we not learn something from the Army Y. M. C. A.? This organization did not go into a cantonment of 30,000 men, put up one fine building and expect the men to use the building in common, but rather it put up eight or ten or even more huts. Is it not possible to follow out this same idea in mining communities? This does not mean necessarily putting up shacks, but rather buildings that are one or more steps up in quality and surroundings from the saloon. It is a case of educating the people to better things, but this cannot be done in one jump.

Why not provide in each residential section of a mining camp a neat but inexpensive building, measuring possibly 20 x 40 ft., containing two or three pool tables, a couple of card tables, a branch library, with magazines and newspapers, an electric piano for music, and a counter where smokes, candy and soft drinks could be purchased? One of these could be erected for each one

thousand of population, and it could be located near the homes of its prospective patrons.

The mining companies operating in these communities should furnish these buildings, as private capital could not afford to indulge in experiments of this sort. The substitute could not expect to make profits as generous as the saloons. The saloon keeper often provided several questionable attractions to draw people to his place of business, but his temperance rival could hardly vie with him in this business.

Not only is it necessary that the company should stand behind the ventures financially, but it is advisable that it should finance and control the institutions, for then they will not be run merely as business propositions. There will be much in the way of price and other regulation. The plan fits itself readily to every size of community. The buildings need not be uniform in size, and in fact where there is much racial diversity, more and smaller buildings would seem to be advisable.

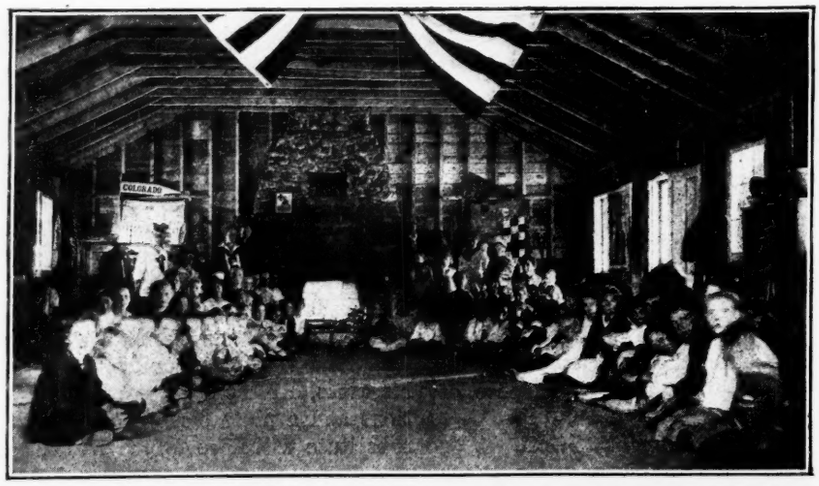
There are several ways in which these "huts" could be administered. They could be organized as Y. M. C. A. substations, and under such organization could include many advantages of the "Y." They might be put under direct supervision of the company, and a man employed to run them, who would be given a guaranteed salary or a percentage of the profits. Either of these plans would probably be preferable to leasing the buildings to concessionaires. The scheme appears to afford a cheaper and more satisfactory plan of replacing the saloon than many of these hitherto favored.

This Company Gives Its Girls a Good Time

FOR a number of years E. H. Morand, superintendent of the schools of Sopris, one of the Colorado Fuel and Iron Co.'s operations, has yearly taken some of the boys of the company's villages on a camping trip, sometimes quartering them in a house but more usually erecting tents for their accommodation.

When Miss Miriam C. Dawley came to Primero in 1916 to be the first community secretary engaged in connection with the Young Men's Christian Association's activities of the Colorado Fuel and Iron Co., she extended this good work by taking about 45 girls from four of the mining towns of that concern for a similar outing in the woods. On this first trip they slept in a schoolhouse and used an abandoned boarding house for kitchen and dining room. Last year the girls obtained the use of the country club at Stonewall. Eleven of the Colorado Fuel and Iron Co. camps were represented and 79 girls in all attended.

These camping trips have been so successful that the company officials decided to build and equip a lodge that could be used as a permanent camp for both boys and girls. The site selected for this lodge is in a most picturesque place near the natural wall of stone at Stonewall, Colo. The building is located in a beautiful pine grove and has been christened the "Camp of the Whispering Pines." The main hall is 25 x 56 ft. and has an immense stone fire-



HOW THE COLORADO FUEL AND IRON CO. GIRLS FROLIC AT THE CAMP OF THE WHISPERING PINES

Above—Interior view of the lodge with girl merrymakers ranged in converging lines from the roaring open fire. Below—A demonstration of the campfire girls in front of the lodge with the the "whispering pines" in the rear

WITH EXERCISE LIKE THIS THE GIRLS OF THE FUEL AND IRON CO. DEVELOP THEIR LUNGS AND SQUARE THEIR SHOULDERS

Above—Return to camp after night spent in the mountains. These girls went up high enough to find a large snowbank. Below—Setting-up exercises at 7:15 a.m. The lodge is in the background. Here, first the girls and then the boys are entertained.

place at one end. This room is used as general assembly room, for games, dances, classes and dining room. The dining tables are portable and are moved out of the way when not in use. The company has furnished all the equipment, including 60 folding cots; the best grade of enamelware, silver knives, silver forks and silver tea, soup and tablespoons, sufficient glassware, a complete set of kitchen utensils, a pressure cooker or digester, a hotel range and hot and cold water. Four shower baths and dressing rooms are being built and a telephone installed. Before the next camping season the kitchen will be remodeled, a new pantry storeroom added and barracks will be built. This will make the camp quite complete and give every facility for comfort and convenience.

This year the girls from 18 of the company's villages, all those that are in this part of the state, were represented, over 200 girls being present. The girls over twelve came in two separate groups and stayed ten days. Another group of girls under twelve years of age stayed for one week. The daily program was as follows: Rising bell, 6:45; setting-up exercises, 7:15; devotional service and flag raising, 7:30; breakfast, 7:45; cleaning up of building and grounds; folk dancing, 9:30; painting and stenciling, 10:00; first aid, 10:30; Red Cross, 11:00; dinner, 12:00; rest hour, 1:00; recreation, 2 to 5:30; supper, 5:30; stunts, 7:30; retiring bell, 9:00; lights out, 9:30.

The company furnished all the girls with transportation from their home to camp and return. As the ground is located 13 miles from the railroad, the girls were taken to and from the station by automobiles furnished by the company. A trained nurse, paid by the company, looked after the physical welfare of the girls and taught first aid. The different camps took turns in putting on the stunts in the evenings and gave many clever performances, which were appreciated by the audience.

On June 23 the lodge was formally opened. Several officials of the company were present and the building was presented to the girls and boys of the Colorado Fuel and Iron villages by S. G. Pierson, vice president of the company. An interesting program was given, the meeting being attended by large numbers of the friends and families of the girls.

The boys' turn followed soon after the girls' closed and was attended by about 100 boys. These camps have been so successful and have been so thoroughly enjoyed and so beneficial to the girls and boys that a more extensive program is already being planned for next year.

We are apt to deplore the fact that some of the men at the mines are prone not to use the best judgment as to the use of their leisure moments. Their ideals and those of their families, we are disposed to declare, are not of the best. Perhaps there has been no attempt, as here at the "Whispering Pines," to uphold higher ideals of amusement and community service, and that may account for the fact that pleasure is sought where only pain and discouragement are to be found.

Safety in the Use of Explosives*

By ARTHUR LA MOTTE†

The development of measures and appliances for avoiding accidents incurred in the use of explosives and for minimizing their results has been the subject of careful study and experimentation. Though there exists among mining men a general familiarity with specified precautions, a closer analysis of the recommendations made by manufacturers is often desirable. The list of "don'ts" seems formidable, but it should prove interesting to mine executives, foremen and workmen.

IT HAS been maintained that it takes three generations to make a gentleman; the same may be said of a man who can be depended upon to engage in hazardous work with a maximum of safety. One must begin with his grandfather. The primary characteristics of the safe man are unselfishness and consideration for others. Personal bravery and nerve, or cowardice, has nothing to do with it. Thorough knowledge of the subject has a great deal to do with it. The most unsafe man on dangerous work, or, rather, in handling dangerous goods, is the man who is afraid to be afraid. He may know that the thing he is doing is dangerous—he may know that it is dangerous to remain where he is under certain conditions—but he is often afraid to take cover himself or to warn others, or to take ordinary intelligent precautions, for fear of being thought afraid.

Timid Attitude of Foremen Detrimental To Best Safety Practice

I remember being in a mine some years ago where five men were killed by the tipping of a skip while it was being hoisted, because several of the men rode on the bail, causing it to tilt in front and engage a crosstie. Positive orders were thereupon issued that no one should be allowed to ride on the bail; and yet, only three days later, when I was coming out of the mine, in company with the foreman and several others, the skip was stopped and several men got on and climbed out on the bail. When the foreman remonstrated with them, saying that this was against orders, one of the men sneeringly remarked: "What's the matter with you? Are you afraid?" This instantly silenced the foreman, who made no further objection, and we went out under exactly the same conditions as those which were known to have caused a fatal accident.

The prevention of this type of accident, it seems to me, can be accomplished only by discipline, laying down hard and fast rules and enforcing them ruthlessly. Education, which is effective in preventing a large class of accidents, seems to be helpless here. If possible, rules should be made so inelastic as to prevent even the officers of the company from violating them. In the army, for general safety, even the commanding general may not do certain things, and I feel it would have a beneficial effect on industrial workers if they knew that their chiefs were not allowed to do various dangerous things which are forbidden the workers.

To return to the subject, it is necessary, to an extent, to begin with the grandfather of the dynamite; that is, the raw materials. These are purchased on specifications, submitted to a rigorous analysis, and are carefully inspected, sorted and strained. The inert or non-explosive ingredients which enter into the manufacture of explosives are just as carefully treated as are the more essential ingredients; and this inspection is brought right up to the last process in the course of manufacture. For instance, the wood meal and nitrates are given the final sieving in the mixing house just before they are put into the tub and incorporated with the nitroglycerin. This latter ingredient is put through a series of processes which would delight the heart of any safety man. From first to last it is "handled with gloves," generally rubber gloves. After separation from the acid it comes in contact only with wood or rubber. It is washed and stored in wooden tubs under water. It is drawn off through rubber pipes, the flow through which is stopped by elevating the end of the pipe. It is weighed in rubber buckets and is transported either through rubber-lined gutters by gravity or by a rubber-tired traveling tank with a rubber hose for a spout. Buildings are floored with rubber and the workmen wear rubber-soled shoes. The scales are covered with rubber, both the platform for the box and the platform for the weights. The weights also are covered with rubber. The operation is carried out in a frame building having an earth embankment entirely surrounding it as high as the eaves of the building itself, and this building is kept as far away from every other explosive building as the experience of the plant engineers shows to be necessary. After the dynamite is made, it is transported, in the process of being punched and packed, in wooden boxes having no exposed metal parts, and is punched with soft rubber-tipped wooden sticks. Special shoes are worn throughout the danger area, and the floors of the buildings have coverings of soft rubber-like material which can be taken up from time to time and burned.

Precautions Developed from Classification Of Accidents

For a number of years a list of accidents in the use and handling of explosives was kept, compiled from the British and Canadian government reports and supplemented by an elaborate system of American newspaper clippings. The object was to classify the accidents which happen in the use of explosives in such a way that a brief list of precautions could be made up which would cover practically every condition likely to arise in the use of explosives in mines, quarries or on construction work. The list is added to from time to time, whenever a new cause of accident is reported. It is not always possible to be specific, but that the list covers the ground fairly well is shown by the fact that in the last few years no accident has been brought to the attention of the du Pont de Nemours management which is not

*Paper to be read at the September meeting of the National Safety Council.

†Manager, technical division, E. I. du Pont de Nemours & Co., Wilmington, Delaware.

covered by the rules and which would not have been prevented had all of the precautions been observed. This list of precautions is printed in the company's catalogs, and I will take each rule in turn and try to explain the reason and necessity of the precaution.

All rules begin with the injunction "Don't." I remember reading this list at a convention of coal miners a few years ago, and one of the miners told me at the end that if he obeyed all the rules he would not be able to use explosives at all, but when I asked him to describe in detail each of the different operations through which he went in his blasting, I showed him that at no time did he do anything in violation of these rules, which was probably the reason why he had never had an accident with explosives.

"Don't forget the nature of explosives, but remember that with proper care they can be handled with comparative safety." The function of explosives is to explode, and a perfectly safe explosive would be useless. The company has always tried to avoid describing any explosive as safe, but explosives can be used in such a way that accidents are avoided, and for the man who handles explosives a good thought to carry is: "Don't take a chance, and don't try conclusions with dynamite." It is dangerous, of course; but so is a mine mule, and both the mule and the dynamite will perform their allotted work and render good service if treated with the proper amount of respect.

Danger of Smoking and Use of Open Lights

"Don't smoke while you are handling explosives, and don't handle explosives near an open light." Not all explosives ignite from a spark with the same facility. Blasting powder and nitro-starch powders are most easily ignited. The paper shells covering dynamite give it a certain amount of protection, but there is considerable difference, even among the various kinds of dynamite, in the ease with which they are ignited. Straight dynamite ignites more easily than ammonia dynamites and gelatins. The permissibles of the ammonia-base type are least easily ignited. A pipeful of ignited tobacco spilled in an open box of dynamite would probably ignite it; it would certainly ignite blasting powder. Open lamps on the hats of men who carry the dynamite around in the mine are distinctly dangerous, as sparks are continually falling from wick lamps, and, although acetylene hat lamps are safer, I have seen a lighted lamp drop into a box of dynamite. The best practice is for powder men to be equipped with permissible electric hat lamps, which are the safest lights known. It is thought that the Park Avenue explosion in the New York subway construction was brought about by a man bringing an open light into the powder house, where a number of detonators had been inserted into the dynamite. I remember seeing a drill runner drop an open bug-light into a lot of paper shells which had been removed from several boxes of gelatin dynamite and which entirely covered a box of primers. This was in one of the New York subway tunnels and probably closely paralleled, except for the result, the Park Avenue explosion.

"Don't carry loose matches in your pockets while loading explosives—use safety matches." A number of accidents have occurred from the dropping of matches from hat bands into bore holes which were being loaded with dynamite. Quarrymen frequently appoint a number of laborers to fire the block-hole and mud-cap shots, for the lighting of which they fill their pockets with matches and stick half a dozen into their hat bands, so that in case one match goes out at a critical time they can quickly lay hand on another. These men are called upon, in the loading of a large blast, such as well drill holes, to assist the blasting foreman, and it seldom occurs to him to take matches away from the men, especially out of their hat bands. In leaning over the holes, matches stuck into the hat band are likely to fall into the bore hole and fire the dynamite. Though dynamite will usually burn peacefully in the open, it cannot be depended upon to do so in a bore hole, and will certainly explode if the detonator has been inserted.

I almost hesitate to read the next rule on the list, as it would seem that no one out of an insane asylum would require it, yet the failure to observe so obvious a precaution has been the cause of many serious explosions. "Don't shoot into explosives with a rifle or pistol, either in or out of a magazine." To an intelligent man it would appear to be a plain case of suicide, and yet not many years ago a customer tried to convince one of the company's salesmen that the dynamite would not explode if fired into with a small-caliber rifle bullet. The customer tried the experiment in his cellar, shooting into several cases of dynamite which he had stored there. However, he failed to prove his point, as the dynamite did explode, killing the experimenter and his entire household. "Don't allow shooting or hunting near magazines." Though magazines should be bullet proof, it is seldom that they are, and, even if they were, the doors are likely to be open when explosives are being carried in or out. The risk of a disaster is too great for any sensible person to take any chances.

Careless Deposition or Storage of Explosives

"Don't leave explosives in a field or in any place where cattle can get at them." Black powder probably would do them no harm, but nitroglycerin is a powerful poison. Although cattle like the taste of the soda and nitrates in dynamite, the other ingredients would probably poison them. "Don't handle or store explosives in or near a residence." In some parts of the country it is the custom for miners to buy their own explosives and take home what they do not use in the day's work. This introduces a great hazard into the home, both on account of the possibility of children getting hold of the explosives and because of the danger in case the building should take fire. The new Federal regulations governing the handling of explosives will probably result in fewer accidents from this cause.

"Don't leave explosives in a wet or damp place. They should be kept in a suitable dry place, under lock and key, and where children or irresponsible persons cannot get at them." There is an increased effort in the matter of conservation to use nitrate of ammonia explosives, which require less nitroglycerin. Nitrate of ammonia explosives are more hygroscopic than other types, although any explosive will deteriorate when stored in a humid atmosphere. Probably the chief cause of explosives taking on moisture is storage in magazines built into the side of a hill in so-called dugouts. The actual loss in dollars and cents from this kind of treatment of explosives is considerable, but there are two

reasons from a safety standpoint why explosives should be kept dry. In the first place, wet dynamite and wet blasting caps produce only a partial detonation, which is likely to cause a blown-out shot, and is highly dangerous in coal mines containing inflammable gases or dust. Secondly, the fumes from a partial detonation are more poisonous than those from explosives which are in good condition and explode perfectly. Dampness in blasting caps is a prolific cause for dynamite igniting instead of detonating, and a charge of burning dynamite in a bore hole fills the working place with extremely poisonous fumes. At present more care is taken to keep explosives under lock and key than was the case a few years ago. Blasting caps are particularly attractive to children, and from 30 to 50 accidents are caused every year through their playing with them, resulting in the loss of fingers, hands or eyes, and occasionally in loss of life. When one considers that a modern blasting cap will blow a hole through a $\frac{1}{16}$-in. steel plate, and that the pieces of flying copper will imbed themselves in iron two or three feet away, it is not difficult to realize what a power for mischief these necessary articles may become.

"Don't explode a charge to chamber a bore hole and then immediately reload it, as the bore hole will be hot and the second charge may explode prematurely." This operation, variously known as "springing," "chambering," pot-holing," "squibbling," and so on, is done by exploding a succession of charges in increasing amounts in the bottom of the bore hole, with little or no tamping, in such a way as to expand the bottom of the hole, so that a larger charge may be accommodated. In some rocks the enlargement is produced by shearing and scaling off rock from the sides of the bore hole, and in others by compressing the rock itself. This latter, of course, is possible only in soft rock. Considerable heat is generated, not only by the explosive itself, but in the compression that occurs, and unless ample time is allowed between "springing" shots, accidents are likely to occur from an explosion of the charges which may be placed in the hot pocket, or become ignited from fragments of fuse or wire insulation. Of course, when the pocket is full of water and fills up immediately after each "springing" operation, there is no danger from the hole being too hot, but another hazard presents itself in the loading of "sprung" holes. That is the danger of the dynamite, especially when a straight dynamite is used and the cartridges are slit, getting between the cracks and crevices of the rock in such a way that when the hole is being tamped it may be pinched under considerable pressure and cause an explosion. For this reason, dynamite of the gelatin type is much safer to use where this operation is regularly performed, but where gelatin cannot be used the next best thing is not to slit the cartridges.

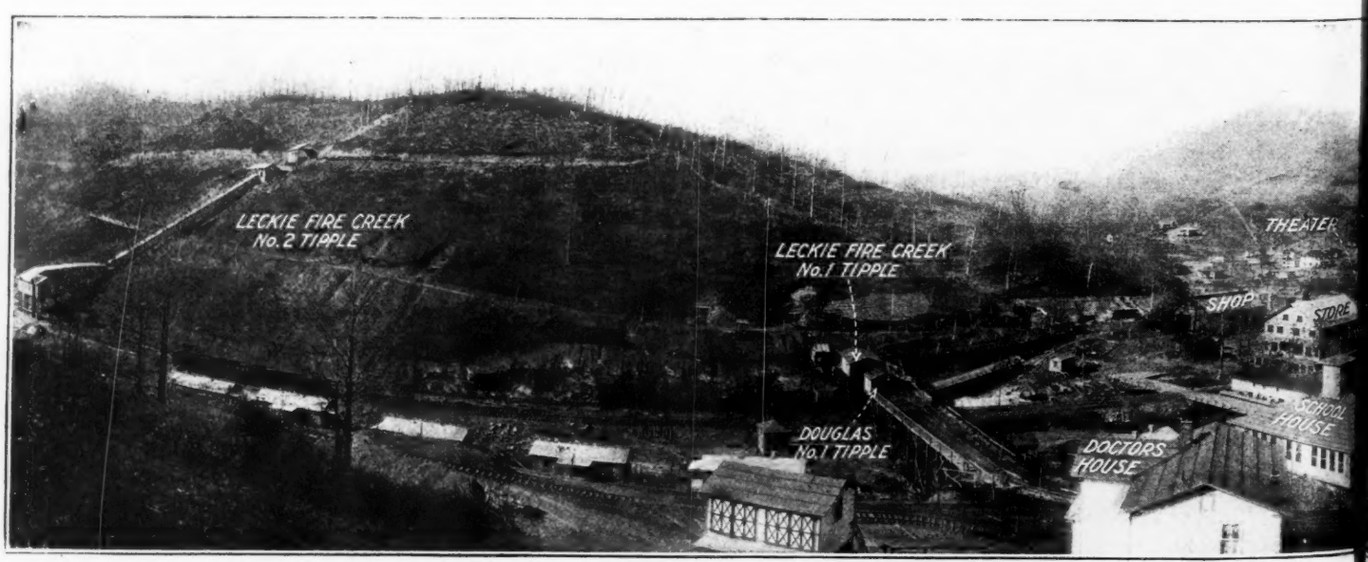
"Don't do tamping with iron or steel bars or tools.

Fireco—A New Mining

Town in Heart of Coal Region Planned for Social,

ONE has but to look at the view of Fireco, Raleigh County, West Virginia, the seat of operations of the Leckie Fire Creek Coal Co., which bears the name of the company's president—Col. William Leckie, of Welch, and of the Douglas Coal Co., of which Colonel Leckie is also president—to secure some conception of how admirably Colonel Leckie and his associates have planned for the spiritual, social and physical welfare of the employees of the companies named as well as for the production of coal. To any one who knows Colonel Leckie such thoughtfulness on the part of the genial Scotchman, who combines business sagacity with a tender heart, is not surprising.

As will be observed from the view of Fireco, the town is grouped about the schoolhouse, the doctor's house, the theater and the company store. That is the pulsating center of this mining community. The schoolhouse seen in the picture is a large four-room building, well lighted and equipped with all conveniences. The company has also provided a schoolhouse for colored children, equally well lighted and conveniently equipped. The miners' houses are provided with modern conveniences such as electric lights, running water, shower baths or bathroom, sewerage, etc. An up-to-



NEW MODEL TOWN OF FIRECO, IN WEST VIRGINIA, SEAT OF OPERATIONS

Use only a wooden tamping stick with no metal parts." There is great danger in punching dynamite with an iron tamping rod, especially in holes bored in hard rock, but I venture to say that nearly half the miners who use dynamite use their drill steels for loading the charges, and, considering the frequency of this practice, it is a wonder that more accidents do not occur. It would seem a simple thing to provide miners with wooden tamping sticks and compel their use, but a number of them look upon it as a needless refinement, and always having their drill steels with them, they prefer to use them. When powder men remonstrate with them, they say that if the drill does strike a spark it will not ignite the dynamite; that they use it carefully and ram the dynamite in gently. However, it is only the survivors who say this. The men who are killed do not give their versions of these affairs. One of the curiosities of legislation was a bill introduced in one of the state legislatures requiring the use of several inches of copper on the end of the tamping sticks. When black blasting powder was used to a greater extent than it is now, copper was looked upon as a safe material to use with it, because it would not strike a spark, and that same feeling has descended to dynamite, but it is just as easy to detonate a drop of nitroglycerin or a pinch of dynamite with a copper hammer as it is with a steel one.

"Don't force a cartridge of explosives into a bore hole." This is one of the prolific sources of accidents in the use of explosives and one of the most difficult to control. If a miner or blaster has a cartridge of dynamite sticking half way down in a bore hole, it is a great temptation to drive it further by main strength rather than let it go and waste the bore hole and all the labor that it represents. Fortunately, modern explosives, which are much less likely to explode from rough handling than the straight dynamites of 10 or 20 years ago, have reduced the number of accidents from this cause to a considerable extent. The remedy, of course, is to have the drill bits always made to gage, allowing for a sufficient clearance over the diameter of the dynamite that is being used.

"Don't have a wire carrying electric current near detonators or charged bore holes at any time except for the purpose of firing the blasts." One of the dangers of having electric mining or quarrying machinery around explosive operations is the chance of one of the terminals coming in contact with the electric blasting-cap wires. Considering the care necessary to make connections properly for firing the blast purposely, it would seem that this danger is remote, but a number of accidents have occurred through careless placing of light wires. When the blasts are fired by the lighting or power current, it is doubly necessary to observe this caution, because, even with special safety switches, there is always a chance of the workmen becoming confused and connecting the wrong wire. Though the power and

Town in West Virginia

Spiritual and Physical Welfare of the Employees

date water-works system gives the community a splendid supply of water.

Even the three-story building which houses the company's store and the company offices is not wholly devoted to commercial purposes, the entire third floor being thrown into one large room used either as a gymnasium or dance hall.

Adjoining the store is a large auditorium building in which every provision has been made for the recreation of mine workers. The auditorium itself, where moving pictures are exhibited, has a seating capacity of four hundred. Another room is set apart as a pool-room. There are also two restrooms in the building in which soda water and beverages of like nature may be obtained. The floor beneath the auditorium room is fitted up as a barber shop. This floor is also equipped with showers.

The plants of the Leckie Fire Creek Co. and of the Douglas company have been electrically equipped throughout. The coal is cut by electricity and hauled by electric power. The mine fans and the big pumps at the pumping station are electrically driven. A large building seen in the illustration houses the machine shop, the blacksmith shop and the electric repair shop.

OF THE LECKIE FIRE CREEK COAL CO. AND THE DOUGLAS COAL CO.

lighting current is generally advised for quarry and construction work in the open, the regular blasting machine is much safer in underground work, as by its use the danger of connecting the blast to a live wire can be avoided, and though in open work the number of shots that it is desired to fire at any one time may be in excess of what the blasting machine can do, it is rare indeed that such necessity arises in mining or tunneling operations. By keeping an entirely different circuit for the firing of the blast, much greater safety in operation is secured, but under no conditions should electric drills, electric punchers or undercutters be operated or other wires allowed around a room where men are charging bore holes for electric firing.

Men Should Be Protected From Blasts

"Don't explode a charge before every one is well beyond the danger zone and protected from flying debris. Protect your supply of explosives, also, from danger from this source." "Don't cut the fuse short to save time. It is dangerous and wasteful of explosive, as it is impossible to tamp such charges properly." There are not many accidents from flying rock where electric firing is practiced, as compared with cap and fuse, because the blaster will not operate the blasting machine if he knows he is in range of the blast, and, even if his leading wire is being continually shortened by the rock falling upon it, he will take care to lengthen it by splicing on other wire until he can get into a safe place; but in quarry work this does not always hold. The blaster is likely to continue to use his leading wire without taking this precaution and get too close to the danger zone. I have seen blasters fire their shots from the cover of an up-turned dump cart while there was an unused half-box of dynamite, with three or four electric blasting caps in it, out in the open a few feet away from them. It would seem an unnecessary hardship to expect the blaster to take all unused explosives and accessories back to the magazine before the blast is fired, as he may have to use some of them in case it became necessary to reprime a bore hole, but it should be impressed upon him that these left-overs should be put in a safe place before the blast is put off.

"Don't hurry in seeking an explanation for the failure of a charge to explode." This is to warn blasters against returning to the face in the event of a hang-fire, until sufficient time has elapsed to render it safe. High-grade safety fuse is a wonderfully reliable device. It is strong, resists abrasion well and stands immersion in water, often for several hours; and it is uniform in its burning speed. Cheap fuse is not regular in its burning rate, is not waterproof and will not stand abrasion against rock in the bore hole nearly as well as the better grades. However, any kind of safety fuse is likely, occasionally, to hang fire. This happens at times from the blaster failing to ignite the powder core, and the jute or cotton wrappings of the fuse may smolder for several minutes and then ignite the core, or, if the fuse is cut in the hole, the powder core may go out but ignite the jute beyond the break, which may cause a hang-fire. It is difficult in experimenting with fuse to simulate the conditions which cause hang-fires, but hang-fires do occur in actual work and are a prolific source of accident.

Accidents happen more frequently, perhaps, from a miscount in the number of explosions. Where eight or ten fuses are lighted simultaneously, two will frequently go off at exactly the same time, making one report. Consequently, blasters are inclined to venture back to the face, even if the reports heard do not tally with the number of fuses lighted, assuming that two or more have gone off together. In the event of a misfire, half an hour is the least time that should be allowed before investigating. Two or three hours is much better, and waiting until the next day is practically safe. Hang-fires can be eliminated by the use of electric blasting caps and electric squibs, and the increased sales of these devices are gradually cutting down the number of accidents from this cause.

"Don't drill, bore or pick out a charge which has failed to explode." A careful miner can sometimes be depended upon to remove the tamping and insert another primer. It is, however, at times safer to drill another hole near the missed one, but this is not practicable in many instances, especially in hard rock and in "sprung" holes. As a precautionary measure against striking the charge in the case of a misfire, it is suggested that a piece of newspaper or a handful of some other easily recognized foreign substance be placed on top of the last cartridge before the tamping or stemming is done. This acts as an indicator, so that the tamping may be removed with comparative safety without any chance of digging into the explosive.

"Don't use two kinds of explosives in the same bore hole except where one is used as a primer to detonate the other." It is a common practice in some sections to place a dynamite cartridge in the bottom of a bore hole and the main charge of black powder on top of that, firing the black powder with fuse or squib. The dynamite explodes from the shock of the black powder, but it does not explode as completely as when detonated by a blasting cap, and it is doubtful if any real benefit is obtained. Different explosives have such different rates of detonation that it is not only wasteful but frequently dangerous to use this method of blasting.

Beware of Frozen or Chilled Explosives

"Don't use frozen or chilled explosives." Although frozen dynamite is more difficult to detonate with a blasting cap than when it is properly thawed, it is more sensitive to other kinds of shock. Before low-freezing explosives became as generally used as they are today, a number of accidents occurred when men broke the frozen cartridges in two or rolled them to break up the frozen crystals. In loading well drill-holes with large-sized cartridges, a number of thawed cartridges could be dropped into the holes, sometimes 100 ft. or more in depth, with safety. Punching a hole into a frozen cartridge is by no means a safe operation, and the fumes from frozen dynamite are more poisonous than from the same dynamite when properly thawed. In fact, frozen dynamite frequently takes fire from the blasting cap and burns up, giving off large quantities of exceedingly noxious gases.

"Don't use any arrangements for thawing dynamite other than those recommended by the manufacturer." Thawing dynamite is one of the frequent sources of accidents, or, rather, it has been, as the use of low-freezing explosives has cut down the number of accidents from this cause enormously. Manufacturers of explosives have investigated every kind of thawing device and recom-

mend only those which they know are safe. Thawing must be done slowly, at a relatively low temperature, and no part of the explosive should be exposed to any temperature higher than that which can be comfortably borne by the hand. It should not be heated on stoves or on hot rocks or metal, or placed on top of a steam boiler, or over any steam or hot-water pipe, or over heated metal surface. The warmer dynamite becomes, the more likely it is to exude, and a drop of nitroglycerin falling a few inches on a heated metal surface may explode. For this reason the radiators or coils in a thawing house should always be over or to one side of the dynamite, and never directly under it. It is often a great temptation to thaw dynamite by putting it directly on top of the radiator, but this is an exceedingly dangerous operation, and radiators should be fenced off so that it is impossible to do this in the thawing house. Explosives should never be taken into or near a blacksmith shop or forge, as the flying sparks are likely to ignite or to detonate them.

Prompt Use of Thawed Dynamite Recommended

"Don't allow thawed dynamite to remain exposed to low temperatures; use it as soon as possible." Blasters often attempt to use explosives which have become chilled or partly frozen, and when remonstrated with say that the powder has been thawed. For this reason, they are urged to use the dynamite as soon after it has been thawed as possible and to take precautions against it freezing again after it leaves the thawing house.

"Don't paint magazine roofs black." On a bright summer day the temperature directly under the roof of the magazine, especially if the ventilation is poor, may rise to as high as 130 deg. This may cause the dynamite to leak, and the waterproofing on fuse and electric blasting caps to run, so that they will not only not be waterproof, but they will not carry the spark or explode. For the same reason, high explosives, fuse or detonators should not be exposed to the direct rays of the sun longer than is necessary. Sunlight tends to decompose nitroglycerin, as well as to cause it to leak if it becomes too hot.

Precaution To Be Observed in the Use Of Blasting Caps

"Don't allow priming (the placing of a blasting cap or electric blasting cap in dynamite) to be done in a thawing house." A separate place should be provided for the operation of priming, so there will be no temptation to use the magazine or thawing house for this purpose. The Park Avenue explosion in the first New York subway excavation was probably due to failure to observe this precaution. "Don't prime or connect charges for electric firing during a thunder storm." A number of accidents have occurred from lightning exploding charges connected for electric firing, not only in the open but in tunnels where leading wires have crossed the rails and the rails have been struck by lightning. "Don't carry blasting caps or electric blasting caps in your pockets." In the first place, the blasting caps are likely to accumulate moisture, in which case they may set fire to the charge instead of detonating it, or become filled with foreign matter, in which case they will not explode from the fuse, and, finally, they are too dangerous and sensitive to make this a safe practice; besides which, they are likely to fall out, become lost and turn up again at an inopportune moment. "Don't attempt to take blasting caps from the box by inserting a wire, nail or other sharp instrument into the caps," and "Don't try to withdraw the wires from an electric blasting cap." The explosive charge in blasting caps is extremely sensitive, as mentioned before, and a box of blasting caps has enough potential explosive force to blow a man in two. The proper way to remove one cap from a box is to tilt it over slightly until a few caps slide part way out, and then withdraw one of the caps with the fingers. "Don't fasten a blasting cap to the fuse with the teeth or by flattening with a knife—use a cap crimper." Crimping caps with the teeth is a common operation, but aside from the danger of biting the shell down on the fuse, it does not make an efficient crimp, and the fuse may come out or moisture get in. The cap crimper is a tool made specifically for this purpose, and it should always be used. "Don't keep electric blasting caps, blasting machines or blasting supplies in a damp place." All of these accessories are either spoiled or their life and usefulness are materially abbreviated by damp storage. A blasting machine which is kept in a dry place will be twice as effective as one not kept dry, and the same is true of blasting caps.

Manner of Wiring

"Don't leave the leading wire connected to the blasting machine." To make assurance doubly certain, it is not a bad idea to carry the blasting machine with one if it is necessary to return to the charge; then it is possible to be sure that nobody has tampered with it or will attempt to fire the charge while one is in the danger zone. "Don't loop or tie wire connections. Scrape the ends of the wires clean and bright and twist them tightly together." In mines where there is much acid water or corrosive gases, it is worth while to have all the blasting-wire connections soldered, as a number of misfires have been observed from connections, which were originally well made, becoming so corroded as to fail of their purpose.

"Don't insert blasting cap or electric blasting cap in explosive cartridges carelessly. Have closed end of detonator point toward the bulk of the charge, and have it tied to the cartridge securely." A large proportion of blasters using electric blasting caps punch a hole diagonally through the side of the cartridge, insert the detonator and take a half hitch around the cartridge with the wires. If the hole is punched through the cartridge at too great an angle, it is likely to go through the cartridge and possibly jam in the bore hole. This would probably lead to a fatal accident. The detonator should lie as nearly as possible in the central axis of the dynamite cartridge, although a slight angle does no harm, provided the end of the detonator is well inside the cartridge. The object in having the detonator point toward the bulk of the charge is that the greatest effect of the detonator is from its loaded end. If the detonator points away from the bulk of the charge, unexploded powder may be deposited in the bottom of the hole and afterward cause trouble. The detonator should always be tied or fastened securely to the cartridge, so that there is no danger of its pulling out when the charge is loaded and tamped. Otherwise unexploded powder or misfired holes may result.

"Don't store or transport blasting caps or electric blasting caps with high explosives." High explosives by themselves are fairly insensitive to shock and will withstand an extraordinary amount of rough treatment at times without exploding; whereas detonators are extremely sensitive both to shock and to sparks, and though they are violent in their explosion, effects are local. When they are carried in the same receptacle or transported together there is established a condition combining the sensitiveness of the caps with the far-reaching force and violence of the high explosive. The rule against storing or transporting blasting caps with high explosives is a particularly necessary injunction, and, unfortunately, it is often largely disregarded in mines and quarries where the powder man carries a box containing twenty or thirty pounds of dynamite with a box of caps or a bunch of primers on top of the dynamite.

"Don't attempt to use electric blasting caps with the regular insulation in very wet work. For this purpose secure 'waterproof' or 'submarine' electric blasting caps." This does not necessarily apply where only one shot is fired at a time, but where several shots are fired there is a possibility of electric leakage and short circuits through the ground to the electric blasting cap wires. This results in the under holes and those adjoining going off and the holes in the middle of the line missing fire. "Don't use old or broken leading wire or connecting wire." Broken wires are prolific sources of misfires and failure to get the shot off at the time desired. Breaks inside of the insulation are not easy to detect, and the use of wire that may contain broken sections or strands often costs much more than would new material.

Effect of Temperature on Fuse

"Don't handle fuse carelessly in cold weather, for when cold it is stiff and breaks easily. It should be warmed slightly before using." "Don't store fuse in a hot place, as this may dry it out so that uncoiling will break it." The waterproofing material on fuse is a compound of various asphalt tars with guttapercha and similar substances which become brittle in cold weather and which also are likely to run if subjected to too high a temperature. It is well worth while to store the fuse, at least immediately before its use, at a temperature between 60 and 80 deg. F. If the fuse is too cold it may crack when uncoiled and cause a misfire or a hang-fire, with its resulting danger, or, if stored in too hot a place, it is likely to go out and cause a misfire.

"Don't lace fuse through dynamite cartridges, and don't place several slit or broken cartridges on top of primer with cap and fuse. This practice is frequently responsible for the burning of the charge." The paper shell of the dynamite cartridge is sufficient protection against the side spit of the fuse from igniting the dynamite inside the shell. Without this protection the side spit is almost sure to ignite the dynamite, which will burn much more rapidly in a bore hole when strongly confined than it will in the open, sometimes causing the loss of a considerable proportion of the charge, besides giving off poisonous fumes and possibly blowing out the tamping and so making the explosion ineffective.

"Don't expect explosives to do good work if you try to explode them with a detonator weaker than a No. 6." The use of modern low-freezing ammonia dynamites has resulted in an immense reduction in the number of accidents, as those explosives are less sensitive to shock and friction than those in general use 20 years ago. At the same time, these explosives require a much stronger detonator to develop their full power then did the older type of explosives. Although it is possible under favorable conditions to detonate even these modern explosives with weaker detonators than a No. 6, there is a considerable factor of safety gained by using the stronger caps. They not only insure complete detonation, but increase the effective power of the explosive and reduce the amount of noxious fumes to a minimum. Explosives which have been stored for some time under adverse conditions become more insensitive, and a larger detonator tends to offset this condition to a considerable extent. Strong detonators will fire larger charges than weak ones, and they not only reduce chances of misfires, but almost entirely eliminate the chance of a properly primed charge burning instead of exploding. No. 6 or stronger detonators are required for all "permissible" explosives which are not "permissible" unless the strong detonators are used.

Amenities in Mine Villages

By C. J. Fuetter

Van Lear, Ky.

In every mine village covered water-tight garbage cans should be provided, each for the use of four families where these live close together. Tenants should be made to understand that all old cans, bottles, rubbish and garbage should be placed in these receptacles where the flies would not have access and from which odors could not escape. In warm weather the material thus deposited should be hauled off at least every other day to some place far away from the camp. There it should either be burned or buried. Hogs and chickens should not be kept in a mine village, as they cannot fail to be nuisances. Cows on the other hand are desirable property around a mining town, if proper care is taken to remove the manure piles regularly.

Round the drift mouths today the ground is too often bespattered with waste carbide. It is not unhealthful, but certainly not sightly. A box might be provided for the emptying of the spent carbide, and barrels of water could be placed nearby so that miners who went to charge their lamps with water could be accommodated.

Who's Next for a Shot at the Kaiser?

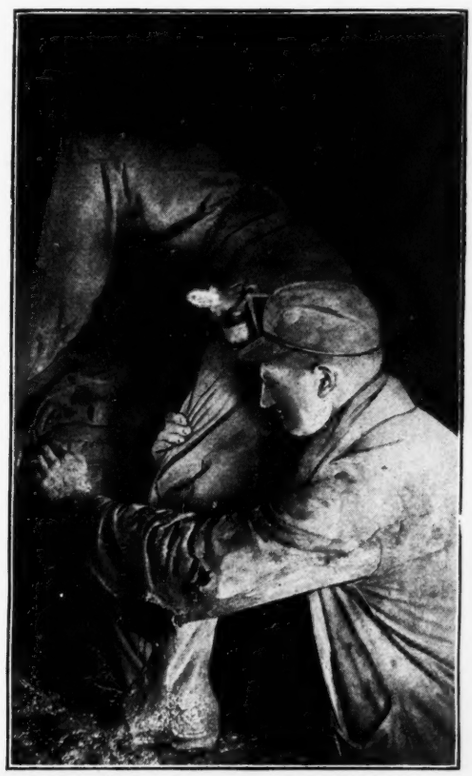
Resuscitated After Long Treatment

RESUSCITATION requires, from first-aid men and doctors, no little perseverance and unswerving faith. It is easy to become discouraged with the failure of the injured man to respond to the efforts made in his behalf. An instance of painstaking treatment and painful doubt, with final success as a result of continued effort, is furnished by the record of the first-aid team which aided Joseph Gemmel, who was smothered in a rush of coal and water at the Morea colliery of the Dodson Coal Co. on Nov. 5, 1917. The final successful result was highly creditable to the medical department and to the first-aid men of that corporation.

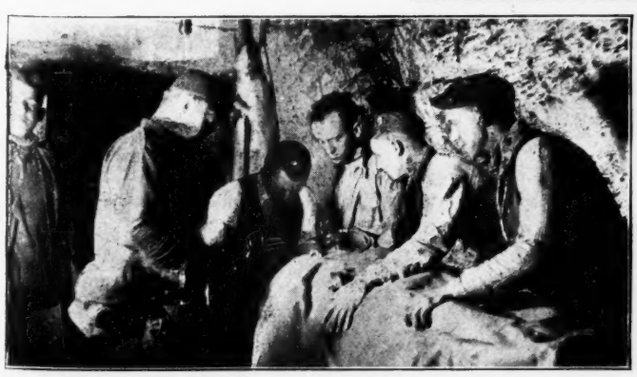
On the morning of the day mentioned, Gemmel and his "buddy" went to work in their breast off No. 4 Rockhole on the East Skidmore gangway, first level. The place had been idle for a few days because of the heavy rains the week before.

His buddy, being out of the way of the rush, called to Gemmel, and receiving no reply, came down to investigate. When near the bottom of the manway he found Gemmel covered up and called help from the next breast. Sending word to the slope bottom about the accident, the men began working the injured man down to an electric locomotive which was under the chute at the time. A nephew of Gemmel's, who was working with the other men at the rescue and resuscitation of his uncle, finally got some response to the efforts he made to enable the injured man to breathe. By this time the first-aid men, who had lost no time in responding to the call, were on hand. Taking hold of the case, they were able, by long-continued effort, to do much in helping in the work of resuscitation. Later the injured man was moved from the gangway to the hospital, which was some 2000 ft. away, and there effective work was done for several hours.

Dr. Frank Conahan, the company physician, meeting the men on the way out was on hand to take charge of the work in the hospital. The doctor and first-aid men worked for three hours before the patient began to show any favorable signs, and two more hours were spent with him before he could be removed to his home in Morea. One of the accompanying illustrations shows the doctor and the men working over the injured man in the mine hospital.



The hopes of recovery were small for a long time, but by sticking to the job and putting forth every effort the doctor and men were successful in saving Gemmel's life. In the work of resuscitation the Schaefer, or prone, method was used, and at times the doctor administered oxygen to the patient. The quick response to the call at the time of accident was one feature for praise, and it aided greatly in securing the final favorable result. Gemmel was the oldest miner in the village, having worked at Morea colliery for thirty years.



ILLUSTRATING THE RESUSCITATION WORK PERFORMED ON JOSEPH GEMMEL, MOREA COLLIERY, MOREA, PENN.
Center illustration—Miners lowering the body to the gangway. Left illustration—Doctor at work in mine hospital. Right illustration—First-aid men and officials at Morea mine. District Nurse Sweeny to left and Dr. Frank Conahan to right

Our Great-Hearted Coal Miners*

BY HORTENSE FLEXNER

THE miner understands necessity. He understands it in a face-to-face and personal way. Because he is familiar with danger, and because he has seen men hurt, he is ready to give and give again to the Red Cross. It is part of his code that a need must be met. If a man is injured in the mine, a "paper is taken" for him. Somebody goes round with a slip of paper and the men sign up for the amount of money they can give the family, until the bread-winner is able to work again. It is an old custom, many years older than the war. It has grown out of the miner's recognition of need—human need. Today the Red Cross is "taking a paper" for the men in France. And the miners, great-hearted people, gentle, with lonely eyes that can visualize human suffering, are pledging their strength to meet the need.

"I'M WILLIN' to give anything but what it takes fer the bare necessities. They need it. Us fellows kin have what we want. They take what they git." It was a long speech for the big, slow giant of a miner, stopped at the entrance of an east Kentucky coal mine, with the lamp in his cap still burning and the black powder of the coal on his face and chest. He was telling why he had given the wages of a day's labor to the Red Cross during the last drive.

"They need it," he said with large finality, speaking unaware for hundreds of heavy-muscled, silent men like himself, working alone, day by day, "fighting the face of the coal like it was a Prussian"—and thinking.

"We give 'em a day," said an older man, with a son in France. "Thur ain't no tellin' how many they give us—mebbe all they got."

Another man, grimy, embarrassed at being questioned, braced a big hand against the wall.

"A day ain't enough," he brought out slowly. "I'd give a day a month to the Red Cross. So would all the boys."

"Did the men get out as much coal on Red Cross Day as on other days?"

"As much? More! They kept a-thinkin' who it wuz fer."

There is always something personal in the references of the miners to the army. "They," with a wave of the hand to indicate far places, "the fellows," "the boys"—never the soldiers. To the miners, the men in France are intimates, friends in danger, doing the day's work, "takin' what they git." There are no camps in the mountains, no uniforms, very few war posters. The military atmosphere is lacking. But in no place could there be a keener appreciation of the meaning of the war, or more vivid realization of what the men in the trenches are living through.

The success of the second Red Cross drive in the mining section of Kentucky was due to three chief causes: the inborn and stiff-necked loyalty of the mountain people to the Government; to the excellent plan of work and education mapped out in the office of the State War Fund by J. R. Downing, campaign manager, and S. W. Calder, executive secretary. The third and very important factor in the success of the drive was the chapter war fund managers, the men and women of the isolated mountain counties who went from mining camp to mining camp, town to town, spreading the word of the Red Cross.

The result of the drive is not wholly known at this writing. But this is known. The nine separate coal divisions of the state totaled more than $200,000. Counties far up in the hills, remembered chiefly because of the long blood feuds of the mountaineers, exceeded their quotas many times. In the most remote places, beyond the railroad, the Red Cross flag hangs in the windows of tiny log cabins and country stores; it stands above the noisy coal tipples, where the little cars from the mine run straight down the mountains to dump the coal in freight cars; and in some camps, it shows above the black mouth of the mine itself. The word has been spread.

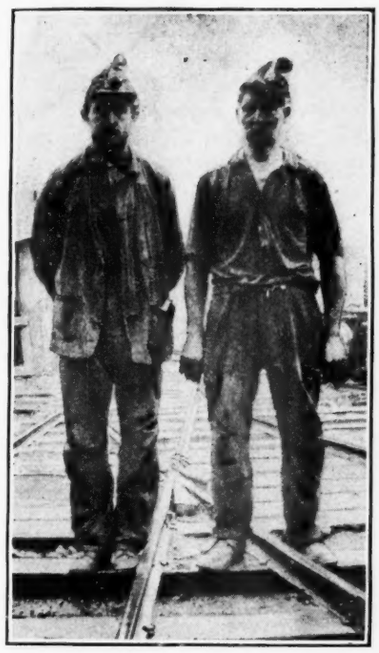
Harlan County, for the most part mining camps and very small towns, raised six times as much money as it was asked for, giving $43,000 instead of $7500. Bell County contributed $42,000, though its quota was $15,000. Perry County ran far ahead of its allotment and Crittenden, which yields fluor-spar, gave a carload of that to the Red Cross, instead of coal. Rivalry between counties was keen, as it was keen between individual workers, everybody doing his best, remembering "who it wuz fer." In the west coal section the operators gave the coal and the miners their wages.

The plan developed by the State War Fund office to interest the miners originated with Mr. Calder, who suggested that the miners be asked to give a day's labor to the Red Cross and that the operators be asked to duplicate whatever the men gave. This seemed a difficult proposition at first. For one thing, the miners were prejudiced against the Red Cross. When the last strike was settled a clause was inserted in the agreement, providing that every miner who stayed away from work without lawful excuse should be fined one dollar for every day's absence. The fine, which had to be given to some impersonal good work, was given to the Red Cross. But the men did not like the fine, and their dislike spread to the recipient of it. A man who was fined would say, in no friendly spirit, that he had been "red-crossed."

To change this impression the State War Fund office secured the aid of Major Gledhill of the British Army, Colonel Perowne and Captain Harris. These men had "been in the war," and had been wounded in battle. For two weeks they stayed in the mountains, going from camp to camp, talking to the men, telling straight facts. In the end the miners were won. When Mr. Downing sent out a pledge card asking the question, "If you knew that a day's pay would save a life, would you give that day?" the men answered "Yes."

Next, the operators were visited and consulted about duplicating the men's wages. One by one they agreed. Placards were sent out to the mines and the men made

*Reprinted from the September, 1918, issue of "The Red Cross Magazine."



James Bullins, who won the gold medal at Kettle Island; and John Butler, the second prize man

John S. Prater, a medal miner at the Te Jay Mine, who is "a little old to fight"

Linnis Lasley won the third medal for Bell County by doing his "best on Red Cross Day"

Virgil Moore earned $25.56 on Red Cross Day. He stands ready to "back up the fellows in France"

Henry Beaute, a Red Cross worker for Harlan, mined twenty-two dollars' worth of coal on Red Cross Day

F. D. Perkins, Superintendent of Schools at Harlan; and Bud Chambers, who gave $28.50

IN THE COAL REGIONS OF KENTUCKY

The miners, great-hearted people, gentle, with lonely eyes that can visualize human suffering, gave each the wages of a day's labor to the Red Cross

ready to do a hard day's work for the Red Cross. In several counties medals were offered as prizes; in others, flags. The mines in the west section gave the men a day's rest before May 21, so that the results should be the best possible.

The amounts earned by the men on Red Cross Day varied according to their strength and the vein of coal. The fact that the coal is cut out by machine and only loaded on cars by the men, makes it possible for them to load thirteen, fifteen, sometimes twenty and twenty-five cars a day. For each car filled the miner receives $1.

James Bullins did a record day's work for the Red Cross in the mine of the Pioneer Coal and Coke Company at Kettle Island. This mine is in Bell County, and it was organized by the Rev. J. Wood Browning, of Pineville, a worker who understands the men, the mines and the need. Bullins won the gold medal in the county, earning $17.32 on Red Cross Day.

"Yes, I did my best for the Red Cross," said James Bullins, coming out of the rain into the superintendent's office. He is a tall lean man, perhaps thirty-five, with fine blue eyes looking strangely bright, because of the black dust all over his face and beard. "It wuzn't nuthin' to do. Why wouldn't I? If we lose, we ain't got nuthin' nohow." Another miner who had won second prize, John Butler, whose earnings amounted to $15.78, appeared at the door. Butler has a boy in France.

A MOUNTAIN HOUSE. THE RED CROSS SHOWS IN THE WINDOWS OF MANY LOG CABINS LIKE THIS ONE

"I had a helper that day," said Butler. "I wanted to take out all I could. I felt like I was a-doin' it fer the boy."

"Pretty hard work, isn't it, loading fifteen cars of coal?"

"Yes, it's hard. But it ain't nuthin' to what they're doin' fer us. An' the coal is needed. I'm willin' to give a day whenever they ask fer it."

The superintendent came in, J. N. Woolum. "The men liked the idea of Red Cross Day right away," said Mr. Woolum, "it wasn't forced on them. It was their affair to accept or refuse. Not a man refused."

Linnis Lasley won the third medal. Lasley is a great-boned fellow with slow, kind eyes.

"I got out all the coal I had. I would have loaded more, but I had to wait for the machine to cut more coal. That took up the time. I wanted to do my best on Red Cross Day. The boys need it. If we could see over there, I reckon it would look mighty bad."

There were men, however, in some of the mines who refused to work for the Red Cross. When they refused, they did not realize just how the other miners would "take it." Bud Chambers, of the Lick Branch Mine at Coxton in Harlan County, told how one of these men was treated. Chambers, incidentally, earned $28.50.

"One fellow threatened to give only five dollars," said Chambers. "We told him we'd drag him out, and he changed his mind. But they did drag some out at Straight Creek. There was a single man there who said he wouldn't give a cent. That was beforehand. When the day came, he did just what everybody else did. I guess he knew how we felt. If he hadn't worked, we made it up to take a collection and give him the money for the Red Cross."

Bud Chambers is an ex-marine and feels keenly about the war. He paused a minute and went on.

"But a man who'd be a slacker would be it one place as well as another. You can't make a fellow do good work if he don't want to. I believe in standin' 'em up against a wall and shootin' 'em down."

In some of the mines, the companies found it necessary to take out the men who had "turned down" the Red Cross and move them to other locations. The feeling ran so high that the loyal miners refused to work with them. Three weeks after the drive a man came to the chairman with a day's wages. The men had refused to work with him and, though he was so late, he was forced to give his share.

"The men don't forget," said Virgil Moore, a great tall fellow, who earned $25.56 on Red Cross Day. "If a man ain't ready to back up the fellows in France, something is wrong with him, and mighty wrong."

Harlan County was organized for the Red Cross by F. D. Perkins, Superintendent of Schools, and every corner of his district was reached. As one of the miners put it, "Thur can't no pro-German stay in Harlan." Mr. Perkins began his work two weeks before the drive,

WASH DAY ON THE CUMBERLAND, IN THE HEART OF THE MINING DISTRICT

getting in touch with men and operators. He did not limit the idea of giving the day's work to miners, but extended it to all "earning people," including physicians, lawyers, teachers, clerks, and postmasters. Every business house in "Harlan Town" was asked for its profits on that day and not one refused. Bulletins were published during Red Cross week announcing returns, and everybody watched the big Red Cross thermometer, where the mercury crawled up and up.

The Harlan Gas Coal Co. was one of the mines where everybody "did his best." The women in the mining camp were as keenly interested as the men and one of them, standing in her door-way with some five or six children about her, said:

"I wanted my man to take out all he could. We kin spare it. When people is sick and when they is hurt, it ain't no time to stand back." The cabin had two rooms at the most, and a man's earnings must have been useful every day. But the mountain people do not "stand back" when it is not time to "stand back."

Henry Beaute is one of the big "Red Cross fighters" for Harlan. But at first he worked under difficulties. This was because one night he made a statement that somebody interpreted wrongly. Beaute was arrested as a pro-German, tried and released. But his feelings were outraged and he went to Mr. Perkins, to ask to be used in some special way on Red Cross Day, to prove his loyalty. Mr. Perkins gave him the pledge cards which the miners were to sign, and Beaute proved that he was in earnest by getting every man at Tway to sign.

"I wanted a chanst to show 'em," said Beaute, "and I did. One thing that made me work so hard, though, was because they claimed the Gov'ment needed the coal." (Beaute got out $22 worth of coal on Red Cross Day.) "Besides," he said, "I asked every man to give—the men workin' on the outside. I proved I wasn't no German."

He stopped a minute and went on. "I'm goin' to git in this fight yet. They ben showin' pitchers uv the Kaiser in this town and I seen 'em. The Kaiser's pitcher gits in my blood. Hit makes me so mad I throw the coal plum over the cars. The Kaiser and his gineration are goin' to be killed out."

At Te Jay one of the big mining camps, and one of the most beautiful, is located. The hills are all around, and the little houses at the foot of them are well built and well cared for. The Commissary is a real department store and is managed like one. The Balkan Mine at Te Jay won the silk flag in Bell County for its contribution of $2100.

John R. Prater, one of the men who won a medal, explained his motive.

"We'd never done much fer the war down here, an' we wanted to help the Gov'ment. I'm a little old to fight, but I ain't no better than them as is gone, and when my turn comes, I'll go."

John S. White, financial secretary of Local Union 3323, worked day and night for the drive.

"I told 'em," said White, "that if they think it's nice to work eight hours and go home, they ought to think of the fellows who can't. Us miners are at the bottom of the war. We feel proud of our task and we are going to take out coal as long as the country needs it."

[The writer declares the operators duplicated the gifts of the miners and in a sense that is a correct statement. The operators actually gave the Red Cross the difference between the selling price of the coal and the labor cost of running the mine for the day.—Editor.]

Meeting of National Safety Council

WITH the motto "To adequately support our army abroad we must conserve our man power at home —we must prevent accidents in the industries of America," the National Safety Council will hold its seventh annual congress at the new Hotel Statler, St. Louis, Mo., the home of the former president, Arthur C. Morey, who is this year the chairman of the committee on arrangements. The meeting is being held before the Liberty Loan drive because the safety engineers of the United States are the most important agents in the sale of those Liberty Bonds which are to make the world safe for democracy and decency. They had to get their meeting out of the way for their loan campaign, which will commence Sept. 28. The special committee meetings will be held on Sunday, Sept. 15, from 10 a.m. till 4 p.m. The morning of Monday, Sept. 16, will be devoted to the annual meeting for all members, the address of welcome being made by Mayor Henry W. Klein, of St. Louis, and the response by the president, David Van Schaack, who also will make his annual address. Reports of officers will follow. At the afternoon session the following addresses will be dedelivered:

"Democratization of Industry," by Charles M. Schwab, Emergency Fleet Corporation, Philadelphia, Penn.

"Personnel Problem in Industry."

"Nationalizing the Safety Idea," by George Ring, Jr., president, Advertising Men's Club of St. Louis, Mo.

"Economic Value of Health of Industrial Employees," by Dr. Thomas Darlington, former chief of Department of Health, New York City, now of American Iron and Steel Institute, New York City.

Safety address reproduced phonographically.

Motion picture film entitled "Why," presented by the United States Steel Corporation.

The phonographic safety address is to exhibit how "canned" addresses can be delivered (in a foreign language, if need be) to mine workers and others. It is an attempt to solve the difficult language question and to meet the problem of the man who has no oratorical talent at his operation and cannot obtain any.

On Monday evening, at 8 p.m., a public mass meeting will be held at the Odeon, 1042 Grand Ave., St. Louis, Mo., for which the following items are listed:

"Safety as an Asset in Winning the War," by Franklin K. Lane, Department of Interior, Washington, D. C.

"Safety in Warfare," by H. W. Forster, general manager, Independence Bureau, Philadelphia, Penn.

New York Central Railroad Co.'s Safety Film, "The Rule of Reason."

On Tuesday morning a general session will be held from 9:30 till 12.

"The Real Problem of the Safety Engineer," by Charles R. Hook, vice president Operating Division, American Rolling Mill Co., Middletown, Ohio.

"How to Organize for Safety," by Frank E. Morris, safety engineer, American Rolling Mill Co., Middletown, Ohio.

"Modern Methods of Safeguarding," by J. J. Heelan, superintendent Bureau of Inspection and Accident Prevention, Aetna Life Insurance Co., Hartford, Conn.

"Does the Attitude of the Foreman Determine the Success of the Safety Engineer?" by W. E. Worth, general superintendent, Chicago Tunnel Company, Chicago, Ill.

Safety address reproduced by phonograph record.

The Local Councils will hold at the same time a meeting of officers and committeemen at which their problems will be discussed. The Chemical, the Woodworking, the Foundry and the Employees Benefit Association sections will hold separate meetings. In the afternoon, from 2 p.m. to 5 p.m., there will be a general round-table discussion on "How To Sell Safety to the Big Boss," and "Promotion of Community Interest in Safety as an Industrial Asset." There will also be meetings of the Health Service, Public Safety, Steam Railroad and Women's sections. On Wednesday, besides the meeting of the Mining section, there will be a meeting to discuss employees' benefits and others for the consideration of safety in construction work and in relation to the iron and steel, public utilities, steam railroad and woodworking industries. A session will also be held of the Public Safety section. In the evening an informal dinner will be held at which President Woodrow Wilson will deliver a five minute address by long distance telephone; R. M. Little, director of the American Museum of Safety, will speak on "Forethought vs. Afterthought in Safety," and James Schermerhorn, the editor of the *Detroit Times*, who so pleased the audience who heard him at Detroit when the convention was held in that town, will deliver an address entitled "The First Set of Fours." Miss Jane Addams, of Hull House, Chicago, Ill., will conclude the evening with some remarks on "The New Place in Industry that the War Has Given to Women."

Thursday will have meetings not only of the Mining section, but of the sections devoted to safety in the electric railway, iron and steel, paper and pulp, cement and textile industries, and to the relation of the Government to safety and employment.

On Friday the automotive, car builders, iron and steel and paper and pulp industries hold sectional meetings. With these the congress closes. There will in all be 174 speakers.

The Mining sessions are given in full as follows:

Wednesday, Sept. 18, 1918

1. Report of Chairman.
2. Report of Secretary.
3. Reports of Committees.
4. Appointment of Nominating Committee.
5. Addresses:

9:30 a.m. "Hazards and Safeguards in Coal Break-

ers and Washeries," by D. K. Glover, Lehigh Coal and Navigation Co., Lansford, Penn.

10:00 a.m. "Is the Experienced Miner More Liable to Accident than the Inexperienced?"

10:30 a.m. "What Relation Has Labor Turnover to Mining Accidents?" by Robert Johnson, Pittston, Penn.

11:00 a.m. "Safety Work in Metal Mining from the Employees' Standpoint," by Edwin Higgins, California Metal Steel Producers' Association, San Francisco, Cal.

11:30 a.m. "Hoisting Ropes," by M. W. Reed, American Steel and Wire Co., Worcester, Mass.

2:00 p.m. "Standardization of Mine Cars in Metal Mines," by Prof. R. M. Raymond, School of Mines, Columbia University, New York City.

2:30 p.m. "Acetylene and Electric Cap Lamps from a Safety Standpoint," by H. M. Chance, Philadelphia, Penn.

3:00 p.m. "Suggested Methods of Keeping Mine Accident Records; Results Which Have Been Obtained," by A. H. Fay, Mine Statistician, United States Bureau of Mines, Washington, D. C.

3:30 p.m. "Hazards in Ore Dressing Plants," by J. S. McKaig, New Jersey Zinc Co., Franklin, N. J.

4:00 p.m. "Handling and Storing of Explosives," by Arthur LaMotte, Manager Technical Division, E. I. du Pont de Nemours & Co., Wilmington, Del.

4:30 p.m. Discussion.

Thursday, Sept. 19, 1918.

9:30 a.m. "Practice of Mine Ventilation," by C. A. Mitke, Assistant Consulting Engineer, Phelps-Dodge Corporation, Bisbee, Ariz.

10:00 a.m. "The Dust Hazard to Health in the Stone Industry," by F. L. Hoffman, Statistician and Third Vice President, Prudential Life Insurance Co., Newark, N. J.

10:30 a.m. "The Effects of the Use of Pneumatic Tools on the Nervous System," by Dr. F. M. Barnes, Jr., St. Louis, Mo.

11:00 a.m. "Abatement of Dust from Drilling Operations by the Use of Water Drills," by W. O. Borcherdt, superintendent, The Bertha Mineral Co., Austinville, Va.

11:30 a.m. Report on Standardization of First-Aid Methods, by Lt.-Col. C. H. Connor, American Red Cross, Washington, D. C.

Careful Records Reduce Mine Accidents*

By ALBERT H. FAY
Assistant Statistician, United States Bureau of Mines, Washington, D. C.

WHEN, in 1911, the United States Bureau of Mines began the collection of mine-accident statistics, there were but few data available concerning the nonfatal injuries in the mining industry. Even the reports of fatal injuries were not so complete as they should have been, but regarding them sufficient data had been accumulated to enable us to point out the principal hazards. The returns, when first received and published, showed what was then considered a high rate for nonfatal injuries, for at that time there was nothing with which to compare it. In about 1911 the first efforts were made in the movement which caused the industrial accident commissions to be legislated into existence. The mining companies had not been accustomed to keeping complete records for either the state or Federal Government, and in many cases not even for their own use.

The recording of all accidents is absolutely necessary if there is to be a reduction in the casualty list at mines. Detailed records will give the exact cause of the accident, and knowing this, in most cases remedies will readily suggest themselves. Records furnish the safety engineer a reliable mass of data about which to formulate ideas relating to safety, safety devices and safer methods of mining. To this end the bureau prepared a form for keeping a record of accidents at mines. On this form is to be recorded the name of the injured person, the date of the accident, the cause, also whether or not it was fatal and also the degree of disability, due to the accident, measured in days lost. A number of the mining companies are keeping this record, and the returns which have been received from these companies indicate that the tabulations are being kept more carefully now than in the past. At the same time they show an increase in the number of nonfatal accidents, but this is more apparent than real, as the industry is no more dangerous than when records were not kept. The record simply brings to light the hidden dangers of a great industry.

The accident rates at mines as heretofore published also appear lower than they actually are, by reason of the fact that in so many instances the operator reports the total number of men whose names appear on the payroll during the year. By reason of the annual labor turnover, the number of men on the payroll is much larger than the actual number of full-time workers, hence in order to get true accident rates it is necessary that the time during which the men were employed be known. Such a record of the hours worked has been kept by the New Jersey Zinc Co., thus placing the accident rates on a basis regarding the exactness or completeness of which there can be no doubt.

The next best step to adopt was to reduce all accidents to a 300-day basis. This, however, does not take into account the 8-hour or 10-hour day, but in most of the metal mines, in recent years, the 8-hour day has prevailed. Many of the inequalities have been eliminated by reducing the figures to a common denominator of 300 days. This, however, does not eliminate the payroll discrepancies, when the number of men employed is given as per total on payroll.

The increasing completeness of records is due in part to the bureau's campaign among mining companies for safer conditions and in part also to the annual requests made to them for reports of accidents during the current year. The enactment of accident-compensation laws is another important cause. The mining companies expect to make returns, and the majority of them, therefore, are now keeping records so that they

*Abstract from an article "Results Obtained by Keeping Mine Accident Records," to be read before the Mining Section of the National Safety Council at St. Louis, Mo., during the Seventh Annual Congress, September, 1918.

may be able to render their report at the close of the year. There is, however, some lack of uniformity as to what injuries they shall record, although it is believed that the larger companies are recording practically all injuries. The accidents which are reported to the bureau are only those which cause disability of one day or more. We do not expect accidents causing a disability of less than one day to be reported, although in some cases it is believed that they have been included.

A recent paper prepared by B. F. Tillson, on "Recording Accidents and Safety Measures,"[1] gives a detailed description of the methods used by the company just mentioned in keeping records of accidents, together with its method of determining rates for comparative purposes, and also many suggestions as to what has been done in the matter of safety improvements and the methods employed among the foremen and shift bosses to reduce accidents.

Mr. Tillson's article shows that for the first four months of the year 1913, without any special safety organization, but with complete records, the nonfatal injuries at the mines which caused any loss of time amounted to 2.24 per 10,000 hours of labor performed. The last eight months of 1913, during which safety-first was inaugurated, the accident rate fell considerably, being reduced to 2.17.

The organization was still more perfected in 1914 and 1915, with the result that in 1916 the nonfatal injury rate was 0.77 per 10,000 hours and in 1917, 0.78. By keeping detailed records, the company has been able to diagnose the principal causes of accidents and apply remedies therefor. By an educational campaign among the employees and by the giving of bonuses to the shift bosses the reduction in accidents has been marked. The records of this company not only show accidents by causes, but also by occupations; and the company also charts them according to the actual number of hours employed in the mines.

Data compiled by a large number of companies on this basis would undoubtedly furnish a reliable basis on which to study accidents and their causes, and at the same time give sufficient information to establish equitable insurance rates. Exact records should contain sufficient data to show the causes of all accidents; hazards by occupations; hazards by mining methods; the days and hours worked and the time lost per accident. This will serve as a basis for insurance rates that will be fair to all. Finally such records will show the real progress that is being made in accident prevention at the mines.

Mine Safety Appliances in Warfare

By F. H. TREGO
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FOR some years prior to our entry into the war, certain men were engaged in the excellent work of devising ways and means to cut down the percentage of accidents that occurred with such startling frequency among those employed in our varied industries. The individuals so engaged were styled "safety engineers," and they carried on their propaganda under the slogan of "Safety First."

The prime object of the safety-first movement is the conservation of human life, while that of war can be summed up in the word "destruction." It did not seem possible when we entered the great conflict that there could be any common ground on which the engineers of safety and the engineers of war might come together. However, as more was learned about modern warfare, and as it became more and more apparent that conservation would be a preponderating factor in the winning of the war, the door was opened whereby the safety engineer could enter and do valuable work.

To save a life wherever possible is not only humane, but at this time, when the necessity of conserving man power becomes daily more apparent, every life saved means a man more to help drive nails in the coffin of German autocracy. In this war, as in no other in history, the men who make up our industrial units—the men who make guns or cartridges, or help transport them, or dig the coal that heats the iron or steel used in their manufacture—are as vital to the success of our war program as the men who are on the firing line.

Among our "industrial soldiers" the practice of safety and the use of safety apparatus had gained great headway, but few ever thought of applying the safety-first principles learned in peace to the needs of the men in the trenches. The safety engineers did, however. They convinced the army officers that many of the things used by the industrial army behind the lines could be employed to advantage by those on the fighting line. It is the object of this article to describe briefly several of the safety devices that have been found useful for war work.

The general public will always associate the name of Thomas A. Edison with devices to entertain or brighten life. To various fields of human endeavor he has probably contributed more than any other man. To the safety movement, in which he has shown great interest, he has given the Edison electric safety mine lamp.

There are, of course, other types of electric safety lamps, but after exhaustive tests the Edison was chosen for use "Over There," and it is one instance of a specific safety device that is now being used in the trenches. Just how these lamps are employed one is not at liberty to disclose, but the fact remains that when the call came a device that had been developed and perfected by the safety movement was ready to "carry on."

Probably the most striking illustration of the development of a safety idea to meet a war need is presented by the Gibbs self-contained oxygen breathing apparatus. A few days after war was declared by the United States an officer in the War Department was asked to devote some of his attention to the question of breathing apparatus, with a view to its being used by the troops. After witnessing a demonstration of the

[1] "Engineering and Mining Journal," Apr. 17, 1917.

Gibbs device, the officer stated that he considered the time consumed in making the tests wasted, as there was no possible chance of the apparatus ever being needed abroad. Strange to relate, however, among the first requests made by General Pershing was one for hundreds of sets of oxygen-breathing apparatus.

Many people are of the belief that a self-contained breathing apparatus is simply a gas mask. Nothing is farther from the truth. The gas masks commonly used by troops in action are machines for filtering certain known noxious gases, and the wearer of the device is at all times obtaining the air he breathes directly from the atmosphere. The air is filtered by the mask in much the same manner as water is purified by passing through a filter.

There are gases, however, which cannot be so filtered, and these gases prove to be the most deadly. Carbon monoxide (CO) is one of them, but it is not what is termed by the military forces an "offensive gas." This means that carbon monoxide cannot be used as a gas for offensive purposes as are chlorine, mustard, phenylcarbylamine, phosgene, xylyl-bromide and various tear and sneezing gases now being released on the battle-fronts in Europe for the purpose of overcoming men. Carbon monoxide is a little lighter than air, and as soon as it is released passes off into the atmosphere. It cannot be held in clouds as are other gases, and therefore is precluded from use for offensive purposes.

There are numerous places, however, where troops do come in contact with carbon monoxide. These accumulations of gas are found in pill boxes, machine-gun emplacements, and in dugouts where heavy artillery is being fired from cover. In spots such as these the air becomes saturated with the poisonous gases, and the men who are forced to breath this air rapidly succumb.

Gibbs Self-Contained Breathing Apparatus

To overcome these conditions there is only one known safeguard—a self-contained breathing apparatus—and the Gibbs machine was chosen by the Government because it was found to meet all requirements. The wearer of this device obtains his air supply directly from the apparatus and not from the outside atmosphere. By an ingenious arrangement of valves, tubes and chemicals the air exhaled by the user of the apparatus is purified, cooled, and fed back to him. The apparatus can be used from two to ten hours without being taken off for recharging.

The United States Bureau of Mines, in conjunction with some well known safety engineers and physiologists, experimented for a number of years on an apparatus that would supply oxygen in proportion to the wearer's needs. It is a most noteworthy achievement of the Bureau of Mines and of the engineers referred to that a machine with this characteristic was perfected in time to answer General Pershing's call, and that within a short time a strictly American self-contained breathing apparatus—the Gibbs—was shipped to him in the quantity he desired.

Another of the inventions of the Bureau of Mines which has proved of service at the front has been the gas detector invented by George A., now Colonel, Burrell. It will indicate and record the percentage of combustible gas even when it occurs in a proportion as low as 0.2 per cent.

To the average person a stretcher on which to carry a wounded man would be deemed a simple device capable of very little improvement. Yet a new type of stretcher was called for by army officers to meet certain every-day conditions in the trenches. All the known makes of stretchers were submitted, but none would answer the purpose. The problem was finally referred to a prominent safety engineer who happened to be in Washington when the matter was being discussed. He was asked if he knew of anything that would meet the requirements. He said he believed he did.

Away out West, thousands of miles from Washington, at a gold mine among the Black Hills, this engineer had seen a stretcher in use which he was positive would prove to be the type so anxiously sought. It had been made at the mine after plans drawn up by the safety department. Telegrams were exchanged, and to the credit of the management of that mine it should be stated that within three hours after the receipt of the first telegram the only stretcher possessed by the mine was speeding on its way to the War Department. When the stretcher arrived in Washington it was subjected to a rigid test and accepted. Today hundreds of these stretchers are in use at the front, thanks to the Homestake Mining Co., of Lead, South Dakota.

Important to Conserve Human Life at Home

To this point conditions in Europe, where our cause for human liberty is being argued at the cannon's mouth, have alone been dealt with in this article. However, it is just as important that we seek the conservation of the men engaged in industrial pursuits at home if those on the firing line are to receive maximum cooperation from the industrial soldiers at home.

It is to be regretted that our casualty lists make mention only of those who are killed or wounded while engaged in battle, while nothing is said about the casualties which occur in industrial pursuits. For many years safety engineers have been trying to awaken the public conscience to the alarming number of accidents occurring in our industries each year and what they amount to as compared with the casualties of war.

Only a few figures to emphasize the need for an intensified safety-first movement can be given here, but these should be an object of just as much attention as the lists of those killed and wounded in battle. Our fatalities at home number between 30,000 and 40,000 a year, or about 125 a day. Our seriously injured total about 350,000 to 400,000 a year, something like 1000 every day. As to minor injuries, about 2,000,000 a year are reported, or about 5000 to 6000 a day.

If these injuries were suffered by those engaged in battle they would all be reported. Why not, then, some centralized effort on the part of our Government to reduce this loss at home? Our workers are soldiers, too, and just as necessary to the winning of the war as the men in the trenches.

We have our fuel administrator, food administrator, railroad director, shipbuilding program, price fixing, etc. Wherever a leak can be plugged Uncle Sam has supplied the stopper. But still the safety-first movement is not taken as seriously as it should be by those most vitally concerned. Why not a safety-first administrator, whose duty it will be to use every means available to stop the waste of life behind the lines?

Forms for Use in Recording Compensation

SYNOPSIS—*How to keep records which will stimulate foremen, assistant foremen and safety engineers in the work of safety and make it possible to ascertain the probable effect, in the cost of self-insurance, of any change in legislation.*

DURING the last few years, safety first has made great strides in all industries. Few indeed, if any, are the occupations that are more hazardous than that of the anthracite miner. Suddenly awakening to this fact, the safety-first movement has gone forward at a rapid pace, and today, it is one of the important issues in the operating department of all the larger coal companies.

For several reasons, the most potent factor in the advancement of safety during the last two years has undoubtedly been the passage of the "Workmen's Compensation Act." Before the act came into operation, few of the companies had any form of relief for their injured workmen. Those that did were more or less indifferent in their attitude to safety, and an accurate record was not attempted. As the workmen themselves contributed a portion of the funds to be expended, and as the time of compensation for injuries was limited (as were also the sums allowed in fatal cases) the yearly expenditures were small in comparison with what they are at present.

A majority of the anthracite coal companies carry their own insurance. A careful record of each case is kept, showing the actual cost of compensating the men in their employ. As a result, each month the management can see in dollars and cents, as well as in "man-days" lost, what accidents mean to the industry. At first these figures were a revelation. A study of the causes showed that by far the greater number of accidents were preventable and due to carelessness or ignorance. Through systematic education and safety devices, together with a rigid enforcement of safety rules, these causes are rapidly disappearing.

To keep an accurate account of all accidents, a practical system of handling compensation is necessary. The following is a detailed account of a method used by one of the larger anthracite companies. While to the reader it may appear cumbersome, it works smoothly and efficiently, and after much experimenting it is found to give entire satisfaction.

While the system involves much detail, it is handled with a comparatively small force and is not expensive. It also has the advantage of keeping the operation heads and the safety engineer in close touch with conditions at all collieries. It also enables them to know with exactitude the degree of safety existing in each of the many assistant foremen's districts. A record is kept both of the expense of accidents and of the labor loss. This system has resulted in reducing the average time lost per accident to a low figure and has kept the men well satisfied, as their cases are handled promptly and fairly. It has, moreover, resulted in a small percentage of disputed cases.

To make so complete a record requires a quick and elastic filing system. The only equipment suitable for this purpose is the visible index file, and this system has been adopted. When reports reach the office of the chief surgeon they are numbered consecutively and forwarded to the adjuster. The state reports are then made and the original papers kept in an individual folder. When the folder is ready for filing, a card (as shown below) is filled out, giving the employee's name, address and occupation, as well as the number of the case and the date of injury.

The card is then placed in the file in alphabetical order. Each card has a space in which the nature of the injury may be entered. The names on all cards are visible, making it decidedly easy to locate a particular case. When a man comes to the office to sign his agreement his name is asked, and he replies, for instance: "John Smith." Thereupon the clerk turns to panel "S" in the file and readily locates the "Smith" desired. Frequently two or more injured men bear the same name. This causes no confusion, as the man's identity is learned through his address, occupation and date of injury. The following forms show the use of the file and the simplicity of its operation.

Smith, James		218 W. Broad St., Lansford, Pa.			Machinist
Case No.	Date	Symbol	Case No.	Date	Symbol
3,190	1/26/17	G-1	.....	.....	.....

Smith, John		148 E. Elm St., Tamaqua, Pa.			Cont. Miner.
Case No.	Date	Symbol	Case No.	Date	Symbol
3,340	2/6/17	L-12	.....	.....	.....

Smith, Joseph		28 E. Ridge St., Coaldale, Pa.			Carpenter
Case No.	Date	Symbol	Case No.	Date	Symbol
3,400	3/10/17	Shops	.....	.....	.....

SAMPLES OF ACCIDENT RECORD CARDS

Each accident is classified as to nature, cause and class and separately classified as occurring either outside or inside the mines. Each accident and its actual expense is entered against the foreman or assistant foreman of the district in which the accident occurred. Foremen are told each month how their district compares with others in regard to number and cost of accidents, and this stimulates them to a greater zeal for the safety of the men and aids the safety engineer in eliminating the causes of preventable accidents.

It is impossible in a tabulated statement to indicate the exact nature of all accidents incurred, but the following list has satisfactorily covered all accidents which have come under notice during the past year. It affords a knowledge of the sources of accident that is indispensable in safety work.

ACCIDENTS CLASSIFIED BY THEIR NATURE—JAN. 1 TO DEC. 31

Nature	Number	Per Cent.	Nature	Number	Per Cent.
Burns	....	4.5	Miscellaneous	....	0.1
Contusions	....	28.7	Not injured, (entombed)	....	0.1
Crushes	....	1.4	Sprains	....	7.5
Dislocations	....	0.4	Suffocations	....	0.2
Electrocutions	....	0.1	Total	....	...
Fractures	....	4.4	Non - compensable accidents	....	...
Foreign bodies in the eye	....	5.8	Grand total	....	...
Infections	....	4.2			
Lacerations	....	42.6			

The following table shows the accidents occurring during the year, classified as to cause, and divided between the inside and outside operations.

ACCIDENTS CLASSIFIED BY CAUSE—JAN. 1 TO DEC. 31

Cause	Inside	Outside	Total	Per Cent.
Animals	.....	.....	.....	1.4
Caught in machinery	.....	.....	.....	4.7
Electricity	.....	.....	.....	0.5
Explosion of dynamite	.....	.....	.....	0.2
Explosion of gas	.....	.....	.....	1.5
Falls of roof or sides	.....	.....	.....	4.1
Flying material	.....	.....	.....	9.8
Falling material	.....	.....	.....	22.2
Falling persons	.....	.....	.....	6.4
Handling material	.....	.....	.....	17.9
Miscellaneous	.....	.....	.....	1.7
Heat	.....	.....	.....	0.0
Rush of material	.....	.....	.....	2.5
Suffocation	.....	.....	.....	0.3
Stepping on material	.....	.....	.....	2.9
Striking obstructions	.....	.....	.....	5.4
Transportation	.....	.....	.....	9.6
Use of tools	.....	.....	.....	8.9
Total	.....	.....	.....	...
Non-compensable accidents	.....	.....	.....	...
Grand total	.....	.....	.....	...

NOTE.—Transportation in the above statement covers all accidents caused by cars, electric and steam locomotives, whether the accidents result from the bumping of cars, the squeezing of men against the rib, the running of cars over them, or from other causes.

Accidents are divided into classes, according to severity, as follows:

ACCIDENTS CLASSIFIED ACCORDING TO DURATION OF DISABILITY—JAN. 1 TO DEC. 31

Class	Inside	Outside	Total	Per Cent.
No time lost	.....	.....	.....	.....
One to seven days lost	.....	.....	.....	.....
Seven to fourteen days lost	.....	.....	.....	.....
Fifteen days or more lost	.....	.....	.....	.....
Permanent partial disability	.....	.....	.....	.....
Fatal accidents	.....	.....	.....	.....
Total	.....	.....	.....	.....
Non-compensable accidents	.....	.....	.....	.....
Grand total	.....	.....	.....	.....

The value of this report cannot be overestimated, for the actual cost of each case is available, and the whole cost of any particular class of accident can be determined. Thus it will be possible to estimate what the cost of compensation will be in case any material change is made in the "waiting period" which is provided in the present law.

There are always a number of noncompensable cases recorded. This is due to the fact that the foremen are not fully conversant with the law and are desirous to report all cases as per instructions. At first, the employees reported to the foreman injuries received outside of their employment, and also those which, while received at their employment, were sustained under conditions which would not bring them under the law.

Sometimes the employees go to the doctor's office claiming injury, but have no confirming report from the foreman. The man is told to bring such a report, and if he fails to have it on his return the foreman is interviewed and the facts ascertained. Decision is then made as to whether or not the case is compensable. When a report arrives from any colliery that is out of the ordinary, the adjuster at once goes to the foreman, gets the witnesses together, if there are any, and obtains all facts pertaining to the alleged accident.

FOREMAN'S CONFIRMING REPORT
NOTICE OF

.....Trifling .....Serious ..... Fata

Accident to.....Exam. Symbol.....Occupation....Rate.....

Street.....Number.....Town.....

Operation.....Section number.....

Date of accident.....Time..... M.....

Physician referred to.....

Last day worked.....

Date of report.....

Foreman.

The doctors are a great help also in preventing fraudulent attempts to obtain compensation. Many times where an injury is claimed a diagnosis reveals the fact that the suffering is from a constitutional disease. At times this disease is excited by a trivial injury, and this is especially true of eye cases. The employee is entitled to compensation, as he has valid proof as to its occurrence. Others have no proof of an injury and after they receive the doctor's attention the fact is established that they are attempting to take advantage of the Compensation Law. Cases of this sort are frequent.

At first many of the employees seemed to be dissatisfied with the provisions of the act, especially the 14-day waiting period. The company, whose record system is being described, continues medical treatment until the injured man is able to return to work. It was realized that the medical expenses in most cases would equal, and many times exceed, the compensation for the first 14 days. This concession of the company satisfied most of the complaints, though there is still an undercurrent of dissatisfaction on that score. Where the antiquated system of paying the doctor $1 a month for professional services and medicine for the mine worker's family is in vogue there the greatest dissatisfaction is found.

Prior to the passage of the compensation act the company, whose compensation records we have been examining, had a beneficial fund to which the employees contributed an exceedingly small percentage of their wages, and those who met with an accident were paid from the fund 50 per cent. of their wages from the date of injury until they recovered. However, no compensation was paid for any time exceeding six months, and no compensation was paid when the injury incapacitated them for work for less than six days. When the employees came to understand the workings of the compensation act and could compare it with the beneficial fund, they saw the advantages of the former.

How Cases Are Handled

The following is a statement in detail of the method used in handling cases from the time of application for employment through a period of disablement, compensation and a return to the mines.

1. *Application for Work*—A blank is filled in at the employment bureau and signed by the applicant.

2. *Physical Examination*—Signatures are compared and defects in the applicant, if any, are noted and notes of identification are taken.

3. *Industrial Certification*—Applicant is given a certificate of examination stating whether he is qualified for employment and for what special line of work he is available.

4. *Employee's Report of Injury*—When injured the employee reports at the colliery office, where a form confirming the injury is filled in and signed by the foreman. A copy is kept on file at the colliery office, one is sent to the chief surgeon, one to the adjuster, and one is given to the injured employee for presentation to the attending surgeon.

5. *Surgeon's Preliminary Report*—When the injured employee presents to the surgeon the foreman's report confirming the accident, he is given medical treatment and a surgeon's preliminary report is made out covering the nature and cause of the accident as well as an estimate of the disability and a description of the treatment. This report is then forwarded to the adjuster's office.

6. *State Reports*—From the information given on the surgeon's preliminary report the necessary state reports are made in the adjuster's office and forwarded to the State Department.

7. *Surgeon's Intermediate Report*—If the disability extends beyond the first or fifteenth of any month an intermediate report is made out by the attending surgeon. This is forwarded to the chief surgeon and by him to the adjuster. This report describes the treatment and gives the condition of the patient.

8. *Surgeon's Final Report*—When the disability ceases a final report is made by the surgeon showing when the disability ceased and the date when the injured person returned to work.

9. *Return-to-Work Certificate*—When the injured employee appears physically able to resume work he is sent to the chief surgeon's office for inspection, and there given a return-to-work certificate. This he must present to the foreman before being permitted to resume work. However, the injury received may not yet be fully healed, and the employee must report to the attending surgeon until he pronounces the injury cured.

10. *Final Report*—As soon as the injury is fully healed a final report is made. Copies of the final report and return-to-work certificate are forwarded to the adjuster's office, and the supplementary portion of the S.O.M. report having been filled out as to days of disability it is forwarded to the state.

11. *Notice to Payroll Department*—Upon receipt of the surgeon's preliminary report a notice is sent to the payroll department, provided the estimate of disability anticipates an absence from work of over two weeks. The payroll department ascertains the average weekly wage of the injured employee for the last six months or for so much of that time as he worked for the company. This statement of earnings is sent to the adjuster.

12. *Adjuster's Agreement*—The adjuster prepares an agreement and the employee, if able, goes to the adjuster's office and executes the agreement. His name is then placed on the payroll. In case the employee's disability is such that he is confined to his home or to the hospital, the adjuster takes the agreement to him for execution and prevents delay and unnecessary hardship to the dependents.

13. *Certified Copy of Agreement*—As soon as the agreement is executed a certified copy is sent to the state and a copy to the auditor, the original being kept on file in the adjuster's office. Once on the payroll the injured employee is placed on every succeeding payroll till his disability ceases. The lightly injured employee receives his compensation at the works, but if he is confined to his home or the hospital the pay of the injured employee is delivered to him wherever he may be.

14. *Receipt for Compensation*—Upon receiving final payment the employee signs a receipt for the full amount he has been paid. This receipt is forwarded to the adjuster, checked with the payroll and then forwarded to the state, thus closing the case.

15. *Adjuster's Records*—In the adjuster's office a record is kept of each accident, showing the colliery and section of the colliery where the injured employee worked, as well as the nature and cause of the accident, the name of the surgeon in attendance on the injured employee, the days that the employee was disabled, the medical cost, the compensation paid and the total expense. With this record made the case is filed and retired for future reference.

A banner bearing the inscription "Safety-First Honor District" is flown each month at the headquarters of that district which has had the lowest percentage of accidents during the month, based on the percentage of man-days of disability compared with the number of man-days worked as contained in the table below.

The form shown below is used as a detail report sheet for each colliery and also as a summary of the accidents, etc., for all districts. The report of an accident shows the place where it occurred. This is indicated by the number under the first column, headed "Section." Take, for instance, the district shown: A-1 would be "A—Colliery Outside." This shows at a glance whether the accident occurred outside or inside the mine. A-2, A-3, etc., indicates all accidents occurring inside, and the different numbers represent the sections and the assistant foremen in charge. This system permits entering each accident in its proper place directly against the foreman responsible in a sense for its occurrence.

NUMBER AND COST OF ACCIDENTS TO EMPLOYEES AND THE RELATIVE EFFICIENCY OF FOREMEN'S DISTRICTS BASED ON MAN-DAYS DISABILITY AND MAN-DAYS WORKED

Period Twelve Months Ending December
District "A"

Section	Foreman or Assistant Foreman	Number of Accidents	Man-Days Disability	Man-Days Worked	Loss in Time Due to Accidents	Compensation Expenses	Number of Accidents	Expenses	Total Expenses	Unit Cost per Man-Day Worked
4	.....	.....	.....	.....	0.009	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	0.012	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
3	.....	.....	.....	.....	0.023	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	0.020	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	0.037	.....	.....	.....	.....	.....
6	.....	.....	.....	.....	0.011	.....	.....	.....	.....	.....
8	.....	.....	.....	.....	0.040	.....	.....	.....	.....	.....
9	.....	.....	.....	.....	0.054	.....	.....	.....	.....	.....
Total..	.....	.....	.....	.....	0.017	.....	.....	.....	.....	.....

Don't Call the Miner Till You Want Him

The *United Mine Workers' Journal* calls for the complete exemption of miners so that they won't be classed as slackers when the war is over, declaring that no halfway status will satisfy the men. It says:

"The coal miners are doing their duty everywhere, in and around the mines and in and around the trenches. They can render service as great, or perhaps greater, in the mines than in the trenches. But there will come a time after the war when men will ask each other the question: 'Where were you in the war?'

"If the Government were to exempt coal miners as a body from military service each man could answer this question without hesitation, as he would have the action of the Government as justification for his remaining at home to produce coal. It would remove all possibility of criticism of any miner who did not enter military

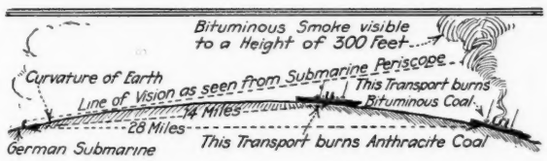
service. But without such action by the Government there will exist a feeling that some one may point a finger at the miner and accuse him of slacking military duty.

"Thus the miner is placed in a delicate and embarrassing situation. He will work just as hard, risk his life and undergo hardships in the production of coal, and there is no reason why any criticism should be directed to him, if he remains in the mines. The Government declares that coal mining is wholly war work."

It is in the same degree war work as is shipbuilding, and men engaged in shipbuilding are not required to perform military service. It would be unjust to criticize shipbuilders for remaining out of the trenches and it would be equally unjust to direct such criticism to coal miners.

The Danger in Smoke

The submarine, while it has ceased to be a national menace, is nevertheless an ever-present danger to both merchant and transport shipping. All allied vessels escaping hostile U-boats do so by one or more of four means—defense, convoy, evasion or flight. Obviously, defense has its shortcomings. Even though the fight may end successfully for the vessel, that vessel may be


Bituminous Smoke visible to a Height of 300 Feet
Curvature of Earth
Line of Vision as seen from Submarine Periscope
This Transport burns Bituminous Coal
14 Miles
28 Miles
German Submarine
This Transport burns Anthracite Coal

Sketch showing Curvature of Earth and Manner in which a Submarine – its Periscope being 12 Feet over Water – can discover a Transport burning Bituminous Coal at a Distance of 28 Miles; while a Transport burning Anthracite Coal cannot be discovered at a Distance of over 14 Miles. This shows that if the Miners of the Anthracite Region can supply sufficient Anthracite Coal to make Power for Our Transports, the Chance of Submarines locating Transports by the Smoke is reduced One-Half.

decidedly the worse for having met the enemy submarine. Convoy, while highly effectual, is expensive and only practical for fleets or large numbers of vessels. Evasion is, perhaps, all things considered, the most satisfactory means whereby a single vessel may escape the U-boat, since flight—that is running away—is open to the same objection as defense—the fleeing ship, although it escapes, may be the worse for the meeting.

The secret of evasion lies in invisibility. To this end various methods of "crazy" painting known as camouflage have been adopted with considerable success. All the camouflage possible, however, will not protect a vessel that makes its presence known through the emission of smoke from its funnels.

The accompanying illustration is derived from a blueprint originating with the Lehigh Coal and Navigation Co., and widely distributed in the anthracite region. This shows the advantage of burning a smokeless coal by transports and other vessels. When a nonsmoking steamer is below the horizon its presence and position are unknown to a submarine 14 miles away. If large volumes of black smoke are emitted, however, the submarine commander will be aware at a distance of 28 miles of both the presence and approximate position of the vessel, even though no part of either hull or rigging is visible.

Thus a lurking submarine may discover a smoke-emitting transport or other steamer at just twice the distance at which it could discern the same vessel if no smoke were being emitted by it. The use of a smokeless fuel such as anthracite is therefore twice as safe (if safety may be said to exist at all in waters infested with enemy U-boats) as is the use of a high volatile smoky coal.

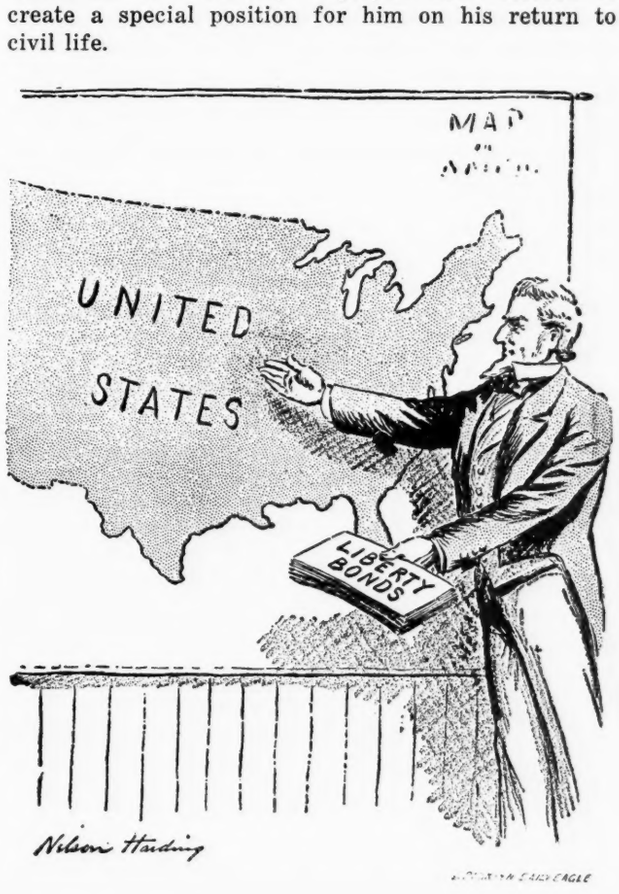
Mine Foreman a General in the Fray

Godfrey Jones, a Welsh mine foreman, who enlisted early in the war as a private and who was nominated Aug. 27 to be a brigadier-general, was once considered by mine officials with whom he was connected for years as lacking the ability to lead men.

According to the *Daily Mail*, Jones, who is 36 years old, attended night school as a boy and finally obtained his diploma. He was appointed foreman in a mine but did not make good and was reduced to the ranks of a digger. Given another chance he succeeded.

Shortly after the war broke out Jones joined the Cardiff "Pals" battalion of the South Wales Borderers. He speedily was made corporal and rapidly rose to the rank of sergeant-major. Later he received a commission.

Jones went to France in the autumn of 1915 and soon afterward was transferred to Saloniki, where he won the Distinguished Service Order and promotion to a lieutenant-colonelcy. Three weeks ago he obtained leave to come home and marry a war hospital worker. The directors of the mining company with which he was formerly employed have decided to create a special position for him on his return to civil life.



Effect of Pneumatic Reciprocating Tools on the Nervous System

By FRANCIS M. BARNES, JR.
St. Louis, Mo.

Apparently the temperature of the mines, the manner of drill operation and its discontinuity have prevented the symptoms of the disease, if the disease actually exists from appearing in mining work. The effects appear quite temporary and are entirely confined to cold weather. They are found most frequently, apparently, in the hardstone industry. The circulation can readily be restored by friction or swinging the arms.

WITHIN the past two years complaints of the ill-effect of the use of the pneumatic hammer have been prevalent in the Indiana stone belt, although these complaints do not seem to have originated so much with the individual user of the hammer as with labor organizations of which he is a member. It has been claimed that the use of the hammer produced a diseased condition in the men using it, affecting the nervous system and even leading to paralysis, insanity and other forms of complete incapacitation.

During a careful investigation on behalf of the Bedford Stone Club auxiliary it was not found, in any instance, that the use of the pneumatic hammer produced any deleterious effects upon the general health of the workers, excepting that among hardstone workers, possibly, consumption was somewhat more prevalent though no higher than is normal for similar groups of people. In fact, it is questionable if it is as high. Limestone cutters as a class are a robust, healthy group of men, somewhat above the average in other industries.

So far as this study is concerned the men using pneumatic hammers on limestone were found to be in good general health, and none of the group examined showed any constitutional disease. Their troubles (supposedly arising from use of the hammer) were limited to a disturbance of the function of the left hand—commonly known as "white fingers," or "dead fingers." As a general thing this condition occurs shortly after the men first go to work in the morning, or until they have "warmed up," but it also occurs during cold weather when the hands are otherwise exposed.

First the little finger and the ulnar side of the left hand (in right-handed men) become pale and blanched; the same area soon giving rise to tingling or numbing sensations, sometimes even to slight pain. The ring finger and part of the middle finger may also be involved in this process. By swinging the arms or rubbing the hands the condition may be made to disappear, and when the hands are warmed the pallor rapidly gives place to diffuse flushing and reddening. The index finger and thumb of the right hand are occasionally affected, particularly in those workers who improperly control the exhaust by their finger or thumb. So far as could be determined this condition of the hands constitutes the sole trouble from which the stone workers complain insofar as the use of the pneumatic hammer in their work is concerned.

The fact that the trouble, when present, preëminently affects the left hand (which holds the chisel and not the hammer) indicates clearly that other factors than the hammer itself are of more signal importance in its causation. The cramped position of the chisel hand with the more or less continuously maintained contraction of the muscles is one of these important factors. However, the hammer or the grip on the chisel, either alone or combined, are not sufficient to produce the condition, as is proved by the fact that it does not occur in the warmer seasons of the year when the stone-cutting industry is at its height.

The disorder of the hands is of a vascular character and not due to changes in the circulatory system, but dependent on vasomotor reaction. The physiological reactions are occasioned by three factors incident to stone cutting: (a) Mechanical irritation of the skin, (b) continued muscular contraction of a cramping nature and (c) cold. Of these three factors, cold is considered most important because (a) the condition occurs during the very cold weather and never in the summer, (b) warmth and measures to restore circulation (rubbing, swinging the arms and the like) cause its disappearance.

It cannot be caused by the effect of the air hammer alone because (a) it occurs in those who have not used the air hammer, (b) it does not occur in warm weather when the stone-cutting industry is at its height and, therefore, when the air hammer is most in use; (c) it occurs mostly in the left hand and not in the right hand in which the hammer is held.

The vasomotor disorder is of temporary duration and is not known to have resulted in permanent disability of the hand, nor itself to have been the cause of development of any other local or constitutional disease.

It is possible that once having occurred the person is rendered more susceptible to its reappearance, just as the one has had his ears or fingers frostbitten or "nipped" by the cold is more susceptible in these parts to the subsequent exposure to cold. This explains the occurrence of "white fingers" in stone cutters when not actually engaged at cutting but otherwise exposed to low temperatures.

The institution of measures to warm the chisel before and while using, enlarging the shank of the chisel and covering it to make it possible to hold without so cramping a grip, the wearing of gloves, and the discontinuance of the prevalent custom of blocking the exhaust outlet, and thus forcing a draft of chilled air out along the chisel and onto the fingers of the left hand would do much toward the prevention of this trouble.

*Abstract from an article entitled "The Effects of the Use of Pneumatic Tools on the Nervous System," read before the Mining Section of the National Safety Council at the Seventh Annual Congress held at St. Louis, Mo., September, 1918.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The labor leaders in the coal industry must be credited with a desire to maintain and support the instruments to which they have set their names in accordance, in each case, with the instruction of the delegates of the union. Repeatedly they have argued in favor of treaty keeping. Again and again they have pleaded that an agreement should not be broken just because the mine worker has had his cupidity aroused.

It has been the rank and file which has advocated breaking the pledged word. When the union saw that standing manfully by its agreements meant martyrdom it came to the operators and the Fuel Administration with many pious professions and advocated a rewriting of the contract, professedly in the interest of the operator and the nation, but really in the interest of the mine worker and the union.

UNION LEADERS PREFER THE HONEST COURSE

Full credit should be given to the union leaders for their preference for an honest course. Since the war began they have not themselves troubled the waters. They have only acted after others did the troubling. To excuse the tergiversations of the members of the union, they have hunted, of course, some condition in the industry that put a fair face on a faithless conduct, and they have presented this condition to the public somewhat shamefacedly, it is true, but often with much excellent effect. But it makes little difference who is the ultimate cause of agreement breaking—the mine workers or the union leaders—in any event the contract is broken and every one must fear that the signing of any more contracts with such people would be little better than useless. The solemn compacts seem to be made only to be broken.

On Sept. 8, 600 free-lance delegates of the northern anthracite field vowed that they would rather dig and fight than dig and starve and then added: "Resolved, That we, the miners of the anthracite region, unable to make a living for ourselves and our families, do hereby ask the right to be inducted into the army, where we shall be recognized as willing to do our bit for God and country."

DEMPSEY AND MACK LOOK TO THE FUEL BOARD

It may be noted that John Dempsey, district president of the United Mine Workers of America in the northern anthracite region, and John M. Mack, the treasurer, refused to recognize this convention, declaring it unauthorized and untimely. The union is discussing the matter with the Fuel Administration. Nine members of the Government are investigating conditions in the Wyoming Valley and in consequence Dempsey and Mack believe that the mine workers should be content to go along, for a time at least, with the contract they have, which has already once been modified. They feel that the mine workers should trust the Fuel Administration to grant a further modification if such a change may be proved in any way reasonable.

Of course, some remarkable statements were made at the meeting. One man said that in two weeks of mining he had earned only $24 and had been at an expense of $26 for powder and labor. It would be well to have these matters investigated authoritatively. The operator whose books have been submitted to every kind of scrutiny should be empowered to gather the facts regarding the work of his operatives so that he can meet these startling statements with a complete rebuttal. As it is, it is hard for any one to know just how diligently any man works. The time has not yet arrived when the time clock is installed at each mine and yet the war surely should demand that every man "work or fight" every moment of the eight hours in every working day.

The movement for more wages is not wholly socio-economical; it is partly political also. There will be an election soon and a general reapportionment in the union of the seats of the mighty. By attacking the contract, the leaders who approved it, who commended it to the mine workers and who later defended it are themselves attacked in a most vulnerable manner. The unshipping of the union leaders is the end aimed for.

HOW MUCH OF THE TROUBLE IS POLITICAL?

But it must not be denied that much of the agitation has a more direct ground and that nearly all the followers of the agitators are actuated by socio-economical and not political motives. It would be absurd to say that the mine workers do not want more pay. Everybody desires just that, no matter what the wage received and no matter whether or not there is a union leader to be discredited.

The mine workers are still restive under criticism. They feel that all the good words said about the shipbuilders are a reflection on other workers, notably on the miners. They also feel resentful because the remarks on liquor drinking are made too generally inclusive. When the men from Raub, Haddock, Pyne, Kingston and Pettebone Shafts, of the Wyoming valley field, recently met they declared that mine workers were the factors in the closing of saloons at hours when liquor tempts the toiler on his way to his work. But this does not answer the statement that some are slacking to drink liquor. It only shows that there are good mine workers and bad, and it exhibits how powerful the better element is if it will do its utmost to promote temperance. These same mine workers declared that they had organized patriotic parades on pay nights, rounded up men from the saloons and had done all in their power to keep a desire for recreation, bibulous and other, from interfering with fullday progress, six days per week.

ANGER OF MINERS SHOWS THE RIGHT SPIRIT

On the whole, no man can blame the mine workers for being sensitive. *Coal Age* recently spoke plainly about the miserable coal loaded out at some certain coal mines throughout the country; and accordingly the honest folk who never sent out dirty coal and lived in a part of the country where a little competition still made careful preparation necessary wrote in and said: "The miner was wholly to blame. Operators never put out dirty coal," and so forth. An honest man does not like to hear evil of his less honest fellows. He feels besmirched with the rest. For this reason we fear it will serve few useful ends to tell the straight-laced temperate miner that all the admonishment against drunkenness was addressed to the man whom he rounded up from the saloon, whom he invited to a patriotic rally and whom he had prevented from securing a drink in the barroom before working hours of the morning.

After all is said everyone must be glad that the mine worker is so wrathful. The number angered is a good indication of the number who feel the needs of the time and lament the intemperance existing. If when the public raved the mine workers snapped their fingers we might fear for the outcome. But, as has been shown, they denounced the aspersions and the louder their denunciations the more sure we are that they purpose to make them untrue.

If the men from Raub, Haddock, Pyne, Kingston and Pettebone will kindly permit it we will mention a difficulty in Winber, Somerset County, Pennsylvania. This mining town, owned by the Berwind-White Coal Mining Co., has

a large foreign population which besports itself with christenings and holidays and even with funerals. It is hard for an American to realize the joy that some foreigners find in the obsequies of a fellow countryman. As a result of these three sources of jollification, celebrated, however, in but one way—by copious liquor swilling—it has been extremely hard to get a full week's work from many of the men.

But again foreigners are not all alike. Some are quite ready to make the sacrifice required. At Mount Carmel—to return to the anthracite region—the Russian Brotherhood has agreed to postpone its convention of Sept. 16 so as not to interfere with the operation of the mines. Michael N. Halkowicz, supreme secretary, received a letter from James B. Neale saying that the action of the brotherhood "is most gratifying to the Government."

On Labor Day 600 employees of the Temple and Raub coal companies, in the Wilkes-Barre section, worked as if it were a regular weekday. The Haddock mine also worked 50 per cent. strong. Cast your eye on the preceding page and note that the Raub and Haddock men were among those who protested against the aspersions on the coal miner. If they all worked like Raub and Haddock men the unkindly criticisms regarding slacking and drunkenness would probably never have been written. The operators in the Lackawanna district had planned for a full day's production, but none of the collieries operated. Nor was it any better in the Lehigh field, near Hazleton. An outing was celebrated and the mines were deserted. However, three of the washeries of the Hudson Coal Co. near Wilkes-Barre were operated, as usual.

Fairmonters Rest Sept. 2 but Work Overtime

On Sunday, Sept. 1, the West Side mining section, near Wilkes-Barre, held a parade in honor of the full day's production that they were proposing to produce on Labor Day. We have already noted how Monongah mine in the Fairmont field worked overtime on Aug. 30 and 31 so that the tonnage of that plant would not be reduced by the Labor Day holiday. The action at Monongah seems to have been that followed by all or at least nearly all the plants in the Fairmont field and vicinity. Dr. Garfield's request was not that Labor Day be not observed, but that, as in the week including July 4, the tonnage of the week should be maintained at its normal level.

In the Kanawha region of West Virginia, the operators of the Kanawha Coal Shippers' Association, 32 being present, met in Charleston, Aug. 30, to discuss bonuses for labor, the securing of clean coal, production and distribution. The bonus trouble is still worrying the operators, for if it is paid the mine workers press for its incorporation in the scale and if it is dispensed with the mine workers are up in arms at the reduction in pay.

The operators in the Fairmont field of northern West Virginia as a body have voted against a recognition of the union. A scale committee had been appointed by the operating committee of the northern West Virginia Coal Operators' Association to meet with the scale committee from the mine workers, who just recently have been unionized. The two committees agreed on the Flemington scale, which is in force in the vicinity of Grafton and at points adjoining the Fairmont field. When this agreement was presented to the directors of the operators' association they voted not to recognize the union at all. The operators, however, which desire to recognize the union, decided to do so individually, and as the Consolidation Coal Co., the largest operating interest in the field, favors this course it seems hopeless for the smaller interests to hold aloof.

The strike at the Brule mine in the Edmonton district, Alberta, has been settled, and 500 men who had been on strike several days about the condition of the washhouse have gone back to work.

A strong movement against double shifting at the mines has arisen in Fernie and Michel, B. C., and the attack on it has been based on its unsafe features in the mines of that section. The Crow's Nest Pass Coal Co. seems to doubt whether the agitation is really based on safety. It believes that the agitation has its origin in the inconvenience of the double shift. As a result the company proposes the placing of three men instead of two in each room, thereby maintaining the tonnage despite the introduction of the single shift.

But the men regard this as an assurance of lower earnings, and it will be argued that if it does not lower their earnings it will be because three men mine more coal than two, and, inasmuch as they mine more coal, will the firedamp be evolved in greater quantity and reach a more dangerous percentage. The larger quantity of gas, it will be said, will be evolved in one single shift and must be removed as generated. More men to injure, more gas to work the injury may seem to some the conditions thus proposed. The company is reducing the gas percentage by provisions taken and whatever action is decided on it is to be hoped that it will be such as will spare the mines from further disastrous accident.

Missouri Miners Promise Future Strike

The Executive Board of District No. 25 of the United Mine Workers, which has jurisdiction in the union affairs of Missouri, has a grievance against the Southwestern Interstate Coal Operators' Association. It appears that the employees of the Kansas City Midland Coal and Mining Co. and of the Western Coal and Mining Co. presented a grievance against those companies to the association, but W. L. A. Johnson, William Richardson and J. J. Ward, representing the association, sustained the coal companies against which the union made protest.

The Executive Board of the Missouri branch of the union says in a letter to F. W. Lukins, president of the association, that the decision of Johnson, Richardson and Ward was in conflict "with the letter and spirit of our joint agreement," and says "We wish to inform you that while under our contract, we have the right to call a strike, we decline to do so because the Government has urgently requested that nothing be done to disturb the production of coal."

The communication further declares that the union postpones the calling of a strike because of the loyalty of its members to the national interest, but "we want you to distinctly understand that we are not waiving our right to call that strike and that we are not waiving the principle in the contract that the operators have thus far refused to recognize. We wish further to inform you that, should your association and the above-named companies continue to do business with the United Mine Workers, some day in the future the contract which the above-named companies and the representatives of your association have ignored will be recognized."

Asiatic Labor for Canadian Coal Mines

In official, political and labor circles throughout British Columbia the recent declaration of Frank Carvell, Canadian Minister of Public Works, that Asiatic labor must be imported for Canadian coal mines if the fuel required for the absolute necessities of Canada cannot otherwise be produced, has occasioned much comment. The suggestion that orientals should be given access to Western Canada without restriction meets with general opposition, and any step having in view their employment in mines in larger numbers than at present would meet with vigorous action, not only from the mine workers' unions, but from every branch of organized labor. The press also opposes the idea, with the single qualification that it might be forced on an unwilling public by the exigencies of a coal famine. To quote one of the leading journals of British Columbia:

"The minister of public works may not understand all the objections to the policy he proposes. His conditional plan would find the strongest opposition in this province, which, of all others, is best acquainted with oriental problems. Nevertheless the statement of Mr. Carvell will have strong support among the people if they find a coal famine upon them. Fuel must be provided, and in the last emergency the Government would undoubtedly call on Asia or any other country for help. But the last emergency has not yet arrived and it should not be too late to avert it."

Reduction in Price of Byproduct Coke

A flat reduction of 30c. a ton in the byproduct coke price has been made by the Fuel Administration. An exception is made for byproduct coke produced in Alabama and in Washington. The principal reasons for the reduction are that the high-priced contracts for coal have expired and that a regular supply of coal now is obtainable at ovens. The price of coal also has been reduced 10c. since the previous coke prices were made.

Indiana and Illinois Coal for Michigan

Action on the part of the Fuel Administration last week makes it necessary for the lower peninsula of Michigan to become a heavy purchaser of Indiana and Illinois coal. All other coals have been zoned out of that territory. This action was taken only after it became evident that Indiana and Illinois coals would not be used voluntarily to any extent in the lower peninsula. There are considerable stocks of high-grade coal in the lower peninsula, which it is expected will be stored for use in the dead of winter. This is one of the steps being taken by the Fuel Administration to limit the use of high-grade coals to essential uses.

Investigating Electric Power Situation

Increased attention is being given to central power plants by the Fuel Administration. An effort will be made to improve the service being given by these companies. An inquiry is being directed by the Fuel Administration to operators securing electric power from central plants asking for certain information with regard to the power situation.

Federal Trade Commission Arraigned for Handling Coal Matters

On the Federal Trade Commission's handling of matters pertaining to the coal-mining industry was based the strongest of the indictments against the Commission by the Chamber of Commerce of the United States. The arraignment of the Federal Trade Commission came in the form of a report from the Federal Trade Committee of the Chamber of Commerce, of which Rush C. Butler is the chairman. The reference to coal in the report is as follows:

Before the Fuel Administration was established, the Commission undertook to influence distribution of anthracite coal, with the acquiescence of the operators. Even if the Commission's belief that there were beneficial results is accepted, it remains true that this was not a proper function for the Commission to exercise and that it did not have facilities essential for the task. It is common knowledge that distribution was so imperfect that proper supplies were not accumulated for the following winter and that widespread hardship ensued.

The Commission later perceived a similar function for itself to controlling the distribution of bituminous coal. It undertook to advise Congress that all bituminous coal should be sold through a common agency at one price for each quality and that the operators should receive individually their cost with an added profit. The Commission itself was to be the agency. This recommendation it made in a report which showed scant data regarding bituminous coal. Legislation under which the Fuel Administration was created authorized the President to utilize the Commission as a distribution agency, but this authority was not exercised and by proclamation of July 3, 1918, most of the remaining activities of the Commission with regard to coal were transferred from the Commission to the Fuel Administration.

In August, 1917, the Commission gave advice to the President which resulted in the prices fixed by him on Aug. 21. The Commission's prices were constructed upon a new computation of costs, which excluded, among other things, interest and depletion. The Commission stigmatized reserves as coal held out of use and allowed no interest for investment in reserves. Part of the data before the Commission was an anonymous estimate of costs in important fields. The correctness of the Commission's method of computing costs is not here in question. The objections on the score of public interest are that the method was new; that it was applied at a critical moment when customary and honest bases of costs should not have been questioned; that it was arbitrary in that it had not been subjected to scrutiny at such hearings of the persons affected and the public as any responsible public body should accord; and that it placed below the cost of production the prices of at least 40,000,000 tons of bituminous coal in the annual supply. In other words, the Commission was not prepared to undertake the highly important rôle it essayed, and dealt recklessly alike with national interests and personal rights.

Fuel Administration to Settle Power Controversy

Settlement of the controversy with regard to the charge to be made for power in Harlan and Bell Counties, in Kentucky, and the contiguous region in southwestern Virginia, has been put in the hands of the Fuel Administration. The action to this end taken by the operators is expressed by the following resolution:

"Resolved, that the committees from Harlan County, Kentucky, Bell County, Kentucky, and southwestern Virginia, representing the coal companies which are consumers of power from the above mentioned fields,

agree to submit the question of fixing the amount of increase necessary to provide the power companies the funds to serve the above consumers with satisfactory power to the Price Fixing and Engineers' Committees of the United States Fuel Administration, and we hereby agree to abide by the recommendations of the said committees, and will so recommend to the respective coal operators of our fields."

Storage Limitation Has No Effect on Prices

Establishment of a system of storage limitation was expected by some to result in breaking the coal price. The storage regulations, however, have gone into effect and no evidence has reached Washington of the price having fallen below the maximum fixed by the Fuel Administration.

Many Miners Worked on Labor Day

A large number of cases in which mine workers sacrificed their Labor Day holiday in order that coal production might be continued have been reported to James B. Neale, the director of production for the Fuel Administration. In some cases the miners worked throughout the day. In others they worked most of the night preceding, so as to be able to take part in the exercises of the holiday. In the Pocahontas and Tug river fields, 1219 cars were loaded on Labor Day. The normal day's loading is only 5 per cent. greater. The coal mines in the Connellsville district of Pennsylvania produced 75 per cent. of the normal output.

Government's Attitude Toward Nonwar Work

One of the clearest statements of the Government's policy toward unnecessary activities or work which can be deferred is contained in an announcement under date of Sept. 6, by Judge Edwin B. Parker, the priorities commissioner of the War Industries Board. Judge Parker, among other things, says:

While it is not the policy of the Government to unnecessarily interfere with any legitimate business, industry or construction project, it must be borne in mind that there is an imperative and constantly increasing demand for labor, material and capital for the production and distribution of direct and indirect war needs, to satisfy which much nonwar construction must be deferred. A full realization of this fact by all loyal and patriotic citizens, including state and municipal authorities, is all that is required to postpone such construction activities as interfere with the war program. The state and local representatives of the Council of National Defense are with confidence depended upon to fully acquaint the whole people of these United States with the pressing need for the most rigid economy, measured not only in terms of dollars but in terms of labor, materials and transportation service. The construction projects which must be now deferred may be undertaken when we shall have won the war and will then furnish employment to the returning artisan now on the battlefront as well as those who will then be released by strictly war industries.

Works which require new permits or licenses, are as follows:

1. After having first been cleared and approved by the War Industries Board, those undertaken directly by or under contract with the War Department or the Navy Department of the United States or the United States Shipping Board Emergency Fleet Corporation, the Bureau of Industrial Housing and Transportation of the United States Department of Labor, or the United States Housing Corporation.

2. Repairs of or extensions to existing buildings involving in the aggregate a cost not exceeding $2500.

3. Roadways, buildings and other structures undertaken by or under contract with the United States Railroad Administration or a railroad operated by such administration.

4. Those directly connected with mines producing coal, metals and ferro-alloy minerals.

5. Public highway improvements and street pavements when expressly approved in writing by the United States Highways Council.

To Save Coal in Power Plants

Consolidation of electric power plants is going ahead rapidly, due to the activity of the Fuel Administration along with the coöperation of other Government agencies. Since a kilowatt of electricity has the same power regardless of the amount of coal used to generate it, a great saving of fuel is effected when plants requiring five, six or eight pounds of coal to generate a kilowatt are eliminated and the electricity furnished from a plant which requires but two pounds of coal to make the same amount of electricity.

Furloughs from Military Service

Furloughs from military service will be used to a greatly increased extent now that the new man-power act is in operation. William M. Ritter, who is thoroughly familiar with the requirements of the coal-mining industry, as well as those of other activities, has been named the representative of the War Industries Board to look after industrial furloughs. He will be the point of contact between the War Industries Board and the office of the Adjutant General.

The Fourth Loan Is a Victory Loan

We Must All Grow Old Some Time, But—

We don't want to be crippled also. The old age of a man who has been unfitted for industry is full of sorrow and often of bitterness toward even his own family. As far as he possibly can every man should keep a whole skin so as to be useful to his fellowman in the war or in industry. Neither the army nor industry can use a cripple. Avoid, therefore, all the accidents you can.

EDITORIALS

ON PAGES 52 and 53 of the advertising section of this issue of *Coal Age* will be found an advertisement to which the attention of every reader is directed. It gives in detail a plan of preparing the way for the sale of the Fourth Liberty Loan. That announcement must command not only careful and immediate attention, but action also.

It is a poor mouth that just now pleads self-interest. The nation's need is not to be urged on any such narrow basis. Yet it is not difficult to see how the energetic carrying out of this plan will not only help to sell the Liberty Loan, but give an impetus to business—your business and that of your employees.

* * *

Business depends as much on enthusiasm as on anything else. Given a win-the-war spirit, the coal output will develop to full proportions. The miner will try to overcome the difficulties of coal transportation by a readiness to fill railroad cars whenever they are available and a willingness to wait for them whenever they are promised. He will put up with other drawbacks also—at least so long as he realizes that the operator cannot be blamed for them.

The win-the-war spirit will transform the mine worker into a catch-as-catch-can worker striving ardently for every opportunity to "boost the game." It is the "win-the-pennant" spirit that makes baseball players ready to act on the instant and ready to wait for the opportunity which only rarely comes to them.

When all the batters are pounding the ball to the outfield and the bases are empty, you won't find a baseman getting ready to go home, or slouching over to the players' bench. Note him! He is awaiting the unexpected with as much energy as if he knew it was coming. This is how it is on the baseball diamond. But put the same man in the mine and a similar condition will often send him home.

The electric locomotive on which he depends is, perhaps, gathering in another heading and will not reach his room for a while, so, discontented, he takes his pail and his coat, runs like a streak for the parting and goes home. He hasn't the win-the-war spirit. He is not in the war. The mine workers are not all of that kidney, but what of that? There are some who are, and they must be brought to the right point of view so that they may do their part and put further enthusiasm in all those who are already doing well. A meeting such as is advocated will serve to put ginger into the whole organization from superintendent down to trapper boy.

* * *

THE tremendous impetus which Charles M. Schwab nas given to shipbuilding has been largely achieved by making every individual engaged in the industry feel a personal responsibility for results and a personal pride in helping to make great results possible.

This spirit of accomplishment in the shipbuilding industry has been brought about by the leaders—the employers—the bosses; whatever you choose to call them; making it a business to come in personal contact with the workers and to inspire and enthuse the men with a sense of the importance of their work for victory in the war—a sense of personal responsibility, and a spirit of teamwork.

* * *

The creation of that spirit among the workers of the nation in all lines of activity would be of incalculable benefit to the workers themselves, to employers, and to the nation.

Concretely two of these results would be: To quicken and increase the response to all war measures such as Liberty Loans—War Saving Stamps—the draft—food and fuel saving and to make the worker feel more keenly his responsibility to do a full day's work (no matter what its character) to the very best of his ability. It would make him feel the necessity of sticking closely to his job.

Employers generally should pursue with intelligent enthusiasm the plan of Win-the-War meetings proposed as a means to aid in the rapid flotation of the Fourth Liberty Loan. The results of such action will not only be helpful in the loan drive, they will be permanently helpful to the nation through the development of a keener realization by the worker of the importance and dignity of his individual job and the necessity for personal responsibility and helpful teamwork.

* * *

EVERY employer can be a leader and a center of influence in this work. The man who operates a small mine with relatively few employees may feel that his circle of influence is too small to be worthy of any effort. That is a mistake. It is the aggregate that counts, as the announcement of the plan very clearly points out.

The man who is in a relatively small circle may not hold so pretentious a meeting—it may not be formal or run under parliamentary rules—it may not be especially announced, or accompanied by music and oratory. But the man who will quietly call his employees around him and informally, thoughtfully, lead discussion into win-the-war channels, pointing out the importance to the individual of doing his best in support of Liberty Loans and all other war activities, can do a real service in this way. It can be so well done in no other way. And ten thousand such little meetings would produce an enormous aggregate result.

* * *

Some operators may feel a degree of reticence about calling a meeting at which it would be necessary to speak or, at least, preside. That feeling it is, of course, necessary to combat. An operator, manager or superintendent should be a leader of men. He should be able to address them, not only about the war, but about a hundred and one matters relating to industry and peace.

But if any mine official fears his inability to perform this duty and feels it embarrassing to talk to his

men, let him join with officials of other mines nearby and call a larger meeting. He can then avail himself of the oratorical ability, magnetism and leadership of others.

Whether his opportunity be great or small, every American mine official should carry out the idea presented in a definite systematic manner. The "program" booklet which is mentioned in the announcement will be found most helpfully suggestive in furnishing plans to meet all circumstances.

Safety Relies on "Come-Along" Spirit

SAFETY movements fortunately fell early into the hands of men who preferred "Come Along" to "Go Along," and their propaganda has, for this reason, been strikingly free from the word "Don't." In the measure in which they have sought to lead and not to drive has been their success. In most cases, without the help of the law, without the support of the power of discharge, without the entire good will of all elements in the management, without even the whole-hearted support of the men whose lives and limbs were to be saved, they have been forced to use the compelling powers of good will, sympathy and understanding. They have been obliged to praise what good they found and to be a little blind to the bad they encountered, and so they have been compelled to work only gradually and by moral suasion toward the best.

Their restrictions have done them no harm. The very weakness and halting character of their work have promoted a feeling of respect. For safety has, at no time, been rendered obnoxious by compulsion. It has been made a pleasant and alluring creed. No fierce penalties surround it. Jail sentences are not relied on to give it assistance, nor does it gain much strength from suspensions or discharges. The safety man does not fulminate. He coaxes, and the results follow. We would all always rather be led than driven. We would even prefer to have a suggestion from a safety man than an order from the executive head of our department. Safety does best when it is treated as a matter of sentiment. Hard-headed men will always regard it as a little mawkish, but thank Heaven, the hard-headed do not predominate; the men with sentiment and moral imagination always outnumber and outvote the others. The ideal wins. Was there ever a better industrial ideal than "Safety First"?

All Derailments Are Potential Casualties

AROUND the mines you hear mine workers talk glibly and with indifference about the derailment of a car or or the wrecking of a trip, though in nearly all derailments and wrecks abides the potentiality of accident to life and limb—of a casualty, at least, if not of a fatality. Until we get to the point of trying to avoid bloodless accidents as well as the other kind, until we begin to investigate them as seriously as others, we shall never reach the ultimate in safety.

But even in our investigations of a fatal mine accident we sometimes satisfy ourselves with the knowledge that it was caused by a derailment. It finds final record in just that way. It is not marked down as the result of tight gage, wide gage, lack of elevation, bad curve, low joint, no fishplate, lack of spikes, absence of rail brace, lack of guard rail, rotten ties, fallen roof rock, coal on road, room frog, light rail, excess speed, failure of brakes, steep grade, locked bumpers, broken drawbar, failed coupling, damaged bumper, bent axle, poorly built car, overload, pushing instead of pulling cars, starting trip, a too-rapid stop, a sudden change in grade which takes up slack, an ill-thrown switch, a high plank, props piled too close to the road, or a car pushed too near the traveling track.

There are many causes, and we should know just what they are. Diagnosis is two-thirds cure, but as yet we have little or no diagnosis. As the definition of a primary cause derailment is too wide of the mark. It serves as much, perhaps, as when we say in recording an accident, "Wife and six children left without support." It is the record of a result and not the record of a cause. It informs us that something is wrong, but not just what.

The reason is because we do not wish to face the real cause. Derailment is so delightfully vague. It does not uncover the real nature of the neglect. The question of safety will never progress unless it is approached in the proper statistical spirit. If we can say the low joints cost so many lives and so many hours of lost labor in 1918, and add that they even cost so much money, we shall have something to guide us as to the value of efficient track supervision. In fact we should also keep a record of the place where the accident occurred. We want no Deadman's Curves or Deadman's Hills in our mine, or even Casualty Curves and Casualty Hills. Let us mark all the danger points in our workings plainly. Perhaps they need a change of curve, or of grade, or of operating method, or it may be a guard rail, a road brace or some track elevation.

What makes for safety makes for industrial surety. What kills a man, destroys a car or lames a mule. What throws a car off the track, spills coal along the roadway. What derails a locomotive, causes timbers to be torn down. What makes a wreck, makes also an idle tipple and sends men home before the day is done. Safety should be the first consideration. If you write it, however, as "Surety in operation is the first consideration," you make it less forceful and less true. Nevertheless, in doing so you put a new light on the matter.

Reckless road maintenance and carelessness in the repair of equipment never did and never will pay, apart from the accidents to persons resulting. In that last accident you had, how many men were laid idle, how long were you repairing cars, and how much material was needed? Even if no one was hurt you probably lost more than would have paid for the hire of a tracklayer for a month or more. When you are short of men, the repairmen are the first laid off. You then begin to lose more by accidents than you can ever hope to gain by all manner of such ill-placed economies.

In many mines may be found places where cars are handled with undue roughness, yet without casualties resulting at those particular points. Such places are the kickback gathering "pits" on tipples, the long gravity planes on hillsides and starting places for long electric locomotive trips. If we would have safety, conditions at these points must be modified so as to make operation less destructive to equipment. A little consideration of the trials of our mine cars may advantage us much in our quest for safety from derailments.

DISCUSSION BY READERS

Permissible Explosives in Mining

Letter No. 1—I read with interest what W. H. Noone had to say regarding permissible explosives, when discussing safety in shotfiring in mines, *Coal Age*, Aug. 1, p. 234. Having had charge of a large number of men and the oversight of shotfiring, in the last few years, I am convinced that the introduction of permissible explosives in coal mining has been the means of saving many lives.

It is a well-known fact that men who are the victims of accidents in blasting are very often those who have had a long experience in handling black blasting powder. Their experience, however, has not taught them to take the precautions that they know should be taken in blasting.

Experienced Miner Takes Chances in Blasting and Is Killed

A year or so ago, I made a special tour of a district in our mine for the purpose of discussing with each man the methods he employed in preparing and firing a shot. The last man I approached with some hesitation, because he was an old miner who had had 30 years' experience in cutting and blasting coal. I felt it would be an insult to ask him to show me how he prepared his squib, and to explain what precautions he took for his own safety and that of others. I dealt with this man very much as a cat would play with a mouse and, without injuring his feelings, got him to show me how he prepared a squib, and his answers to my several questions convinced me that he understood his business thoroughly.

The following morning, I missed several men from their places, and, fearing something was wrong, hurried along until I reached the man's place of whom I have just made mention. To my surprise and sorrow, I found him lying unconscious on the floor of his place, with several lacerations and a fractured skull, from which he died a few minutes later. Following my talk with him the night before, nothing could have convinced me that he would ever take the desperate chance that his laborer and others had seen him take on many occasions and which had, at last, cost him his life.

Shortens the Match on His Squib

A similar instance of foolhardiness occurred when I entered a place where a miner had just finished tamping his shot and was withdrawing the needle from the hole. He sent his laborer to the gangway, and I watched him start to prepare his squib. As he placed it in the hole, I walked leisurely to the crosscut about 15 ft. back from the face, on the other side of the room. The miner followed me to the place, on the run, and had barely turned the corner of the crosscut when the charge went off, throwing a large quantity of fine coal into the opening, almost catching him, myself and another miner who was eating his lunch in the place.

Knowing well that he doctored his squib after I left him, I asked him for his squib box. Taking one of the squibs from the box, I prepared it in the same manner as he had done in my presence a short time before. Then, igniting the end of the match, I timed the action of the squib as 1 min. 8 sec. Taking another squib from the box, and preparing it in the same manner, I broke off a portion of the match, about what I assumed he had broken off when firing the hole. The time for the squib to get action, in this case, was 8 sec. only. The man, then, frankly admitted his mistake in shortening the match. This is but one of the many chances experienced miners take with black powder, which they could not take in the use of permissible powders.

Those who have used permissible explosives will bear me out in the statement that such a cartridge rarely, if ever, becomes stuck in the hole; there is no loose powder spilt from the cartridge when charging; and the charge can be tamped as effectively with a wooden tamping rod as with a steel bar. The charge hole is fired with an electric battery, after the miner has gone over his wires and made sure that there are no breaks. The firing is done from a safe distance and there is no chance of a premature blast.

Should the hole misfire, in electric blasting, the miner at once disconnects his battery and, after a reasonable time, goes over his wires to ascertain the cause. On the other hand, if a misfire occurs when using a squib or fuse, there is always the danger of the shot exploding several minutes later, which leaves the miner in doubt and uncertainty.

Permissibles in Inflammable Coal

When working in coal that was highly inflammable, I have used "Monobel," "Aetna" and other brands of permissible powders. In driving more than two miles of narrow work and working 15 chambers 800 ft. long, in this district, I have never had reported a fire, or a feeder being ignited by the use of these powders. The men have adapted themselves readily to its use and no complaints have been heard. My experience convinces me that mine fires and accidents of this nature would be reduced to a minimum by the use of permissible powders. On the other hand, I believe that as long as blasting is done with squibs, fuse and black powder, such accidents will continue.

We sometimes hear the objection offered that the higher cost of permissible powders stands in the way of their general use. However, it should be remembered that to offset this increased cost, there is a far greater reduction in the amount that may need to be expended as compensation for injuries received in the mine. The Bureau of Mines is to be congratulated on the success of the work they have undertaken in introducing permissible powders in coal mining.

L. R. THOMAS,
Section Foreman, Woodward Mine.
Edwardsville, Penn.

Squibs vs. Electric Fuse

Letter No. 2—Referring to the inquiry of "Miner," *Coal Age*, July 20, p. 145, regarding the relative safety of squibs and electric fuse in blasting with black powder or permissible powder, and the request of the editor for a general discussion in regard to the safety and adaptation of single and double-tape fuse, squibs, electric fuse and electric detonators in blasting coal, permit me to offer the following from my own personal experience in this line of work.

In my opinion, while the squib is the simplest and cheapest means to employ to explode a charge, it is the most dangerous. The common squib consists of a thin paper tube ⅛ in. in diameter and 6 in. long, containing fine black powder. At one end is the match. Either the twisted paper is dipped in sulphur, which flames when ignited, or touch paper is used, which smolders but produces no flame. On that account the latter is generally considered safer than the sulphur match.

Dangers in the Use of Squibs in Blasting Coal

The chief danger in the use of the squib lies in the desire of miners to hasten its action by shortening the match, or by bending the sulphur match downward so that the flame will climb quicker to the powder. The match is sometimes moistened with oil for the same purpose.

Again, when the hole pitches, which is generally the case in inclined seams, a train of powder frequently follows the needle as it is drawn from the hole. The powder train may extend to the mouth of the hole and be fired by the flame of the lamp when igniting the match. In a gassy seam the gas may issue from the hole, and its ignition would at once fire the squib and cause an immediate explosion. In such seams it is quite common to strike a strong feeder of gas when drilling a hole preparatory to firing a shot.

Gas Ignited When Squib Is Lighted and Causes a Premature Explosion

An incident that happened some years ago when I was working as a laborer in the anthracite coal fields impressed forcibly on my mind the danger of using a squib when blasting in a gassy seam. In that instance the hole had been tamped and the needle drawn, and I stood behind the miner as he prepared the squib and placed it in the hole. In igniting the match with his lamp the gas coming from the hole was ignited and the flame issued some distance from the mouth of the hole, causing us both to jump instantly for the crosscut, which fortunately was only 6 ft. away. Hardly had we reached cover when the charge exploded, throwing the coal in all directions. Such an accident could only happen in the use of a squib.

Of tape fuses there are three forms—single-, double- and triple-tape fuse. The ordinary tape fuse consists of a train of fine powder laid in hemp or cotton, which is then covered with one or more layers of tape to render it waterproof. The rate of burning is from 1½ ft. to 2 ft. a minute and this is generally specified by the manufacturer. Depending on this stated rate of burning, the blaster estimates the length of fuse required to permit him to reach a place of safety before the shot will explode.

By cutting a greater length of fuse, it is possible to lengthen the time should it be necessary to do so, and in that respect the fuse has the advantage of a squib. However, the rate of burning cannot be guaranteed. It is common for a tape fuse to be injured and hangfire for a considerable time. When that happens the miner often becomes impatient and, believing the fuse has gone out, proceeds to investigate. This has been the cause of many a miner losing his life, being blown to pieces by the delayed explosion.

To reduce accidents from this cause the mining laws of British Columbia provide that, in case of a misfire, the place shall not be entered within 4 hr., unless an electric igniter is used, when this interval is reduced to 15 min., which is the time that a miner must wait after attempting to fire a charge that misses.

The use of fuse gives the thoughtless miner every opportunity to display his recklessness. Strange as it may seem, I have observed miners who, in order to save 3 or 4 ft. of fuse in firing a deep hole, would cut a piece of fuse 2 ft. long, attach it to the powder cartridge, then "spit" the fuse and, with a dummy cartridge of tamping material, push the charge to the bottom of the hole, follow this with one or two more dummies and run.

Another dangerous practice is to lace the fuse around a dynamite cartridge or even pass it through the same, which may start the explosive to burning and prevent its detonation by the cap. All such practices are impossible in electric ignition.

Electric Fuses and Detonators

An electric fuse, or "squib," as it is sometimes called, is a paper shell containing a mixture that flames when an electric current passes through it. The lead wires conducting the current pass into and are made fast to the shell. The cap thus arranged resembles an electric detonator. The ignition of the charge is caused, however, by flaming and not by detonation.

The electric detonator is a cap or shell of copper, containing a fulminate, which is detonated by the electric spark that passes between the terminals of the lead wires attached to the cap and causes the explosion of the charge. This has been fully explained, however, by the editor, on page 145.

In electric firing it is important to choose a detonator whose strength is adapted to the work required. Too strong a detonator is better than one not strong enough. No. 6 or stronger should be used with permissible powders. Tests show that an explosion is quicker and more complete and a smaller volume of poisonous gas is generated when a strong detonator is used; also, with a strong detonator less difficulty is experienced on account of the age of the explosive.

Precautions To Be Taken in Electric Firing

Before closing, I wish to state that electric firing by fuse or detonator is, today, the safest means to adopt, as it avoids all uncertainty and the dangers so common in the use of tape fuse or the miner's squib. In electric firing the simplest precautions insure safety. In the interest of the great safety-first movement, firing by other means should be prohibited by law.

In my experience, the following are the precautions essential to safety in electric firing: (a) Make sure

that the electric detonator is firmly secured in the explosive. (b) Avoid the use of gritty tamping material that might injure the lead wires and short-circuit the current. (c) Make sure there are no kinks in the lead wires and avoid injuring these wires in tamping. (d) Clean the ends of the cable wires and the lead wires before joining them. (e) Insure a good contact of these wires by twisting them firmly together. (f) When connecting the cable wires with the terminals of the battery, insure a good contact by cleaning the wires and screwing them down firmly. (g) Examine the battery occasionally to see that it is in good condition and that the parts are not corroded, demagnetized, or the gearing damaged. (h) Never connect the cable wires with the battery, until the moment of firing and after making certain that no one is in the vicinity of the blast. (i) The shotfirer must have full possession of the key to the battery. In using the battery, the handle must be plunged or turned with a quick firm action.

J. W. POWELL.

Cassidy, B. C., Canada.

Letter No. 3—The question of firing shots with the old miner's squib or tape fuse, as compared with electric firing, takes me back, in memory, to the days when black powder was fired by squibs and fuse and many accidents were the result. Today, the use of permissible powders fired by electricity has greatly reduced the number of these accidents.

Briefly stated, the chief advantages in electric firing are that the charge can be exploded at the exact time desired. No time is wasted in waiting for the fuse to burn and the miner cannot take chances in firing, as he does in the old way. Formerly, it would occasionally happen that the squib was imperfect and the powder extended into the match, so that the shot would go off when the match was lighted before the miner had an opportunity to get away.

At other times (but this would happen more often in the use of fuse than when the shot was fired with a squib) the shot would hangfire, and the miner would come back thinking it was a misfire. At times, he would even start to drill a second hole to blow out the charge and would be caught by the explosion of the first charge.

When using fuse, the miner would often crimp the cap on the end of the fuse with his teeth instead of using a pair of pincers for that purpose. In some instances the miner's head would be blown off or he would lose a hand by the explosion of the cap when crimping it to the fuse. It is my belief that there is no safety for the miner in the use of either squibs or fuse.

REQUIREMENTS OF BATTERY IN ELECTRIC FIRING

A safe battery, for electric firing, must possess certain requirements. The parts of the battery must be inclosed in a tight substantial case so that no contacts will be exposed, except the binding posts or terminals to which the firing leads are connected when the battery is to be used. In order to provide against the unauthorized use of the battery, it is provided with a detachable handle or a key, without which no current can be generated.

The battery must be in charge of an authorized and competent shotfirer, who must never connect the firing leads with the terminals of the battery until all steps preparatory to the firing of the charge are completed. He must permit no one to make these connections but himself, and then only after he has made sure that everyone is in a safe place. Immediately after firing a shot he must disconnect the firing leads and remove the handle or the key from the battery.

Should the shot fail to go off the shotfirer must permit no one to approach the place for at least 5 min. after making the attempt to fire the charge and after the lead wires have been disconnected with the battery. To insure the proper working of the battery, it should be inspected from time to time and tested to insure that its capacity for firing a charge has not decreased.

Leckrone, Penn. SHOTFIRER.

Sealing Off Fire on Intake

Letter No. 13—I have been much interested in the discussion, in *Coal Age*, regarding the sealing off of a mine fire that has gained considerable headway, in an intake entry. Having had several years' experience fighting mine fires, in the Newcastle district of Colorado, I desire to add a few remarks giving my own ideas in reference to this subject.

In the first place, I believe in being prepared when operating a fiery and gaseous district in a mine. To this end, let me suggest that a wise precaution to take, in such a case, would be to build two frames of 6 x 8 in. timber, one in the intake and the other in the return airway of the section.

These frames should be walled into the rib to the depth of a foot, using concrete or brick for the purpose. To provide drainage, a short piece of pipe with a valve should be built in where the ditch passes under the wall. On the roadway, at this point, two short lengths of rail should be used, which can be quickly taken up and the floor prepared when there is need of closing the stopping.

Should the occasion arise requiring the stoppings to be closed, the work must be started on the intake by boarding up the opening in the frame. Starting at the top, the boards should be made to lap each other about a half-inch, which makes a better job when sealing the cracks with clay or plaster. This will allow of a space of 5 in. for concrete or brick.

The return stopping is now started about a third of the way down from the top and the boards made to lap about a half-inch and plastered, in the same manner as in the intake. A pipe or valve should be inserted in the stopping and left open until the stopping has set.

While building these stoppings, the air current should be short-circuited by making an opening in the next stopping outby. When the work has been completed thus far, further operations should be suspended for a period of 24 hr., after which both stoppings should be finished with brick or concrete.

In my opinion, it is a grave mistake to close the return stopping first. This would have the effect of shutting in a quantity of air behind the stopping, with the result that an explosive mixture would form and an explosion take place, which has proved to be the case, more than once, in the Newcastle district.

Reliance, Wyo. WILLIAM HARRIS.

Priming a Cartridge

Letter No. 2—Referring to the letter on this subject by "J. P. G.," *Coal Age*, Aug. 15, p. 327, permit me to say, that in the interests of safety and to secure the best results in blasting a detonating cap should never be inserted in the side of the cartridge or the lead wires laced around the same, as he has described.

My experience convinces me that there is only one safe method of inserting a cap in the primer. For this purpose, the end of the primer cartridge should be opened and the cap inserted until it is fully covered by the contents. The paper at the neck of the cartridge should then be securely tied about the lead wires with a string so that the cap cannot be withdrawn when charging the hole. An experienced shotfirer will provide himself with string for that purpose so that no time will be lost when preparing to shoot.

Taking a half-hitch with the lead wires about the cartridge is liable to cause a bad kink or injure the covering of the wires and cause a misfire. Also, when the detonating cap is inserted diagonally in the side of the primer it is apt to be drawn out of the cartridge, or even exploded, by rubbing against the sides of the hole when the primer is being pushed home.

Let me suggest, here, that where two or more cartridges make up the charge it is well to open the paper where the cartridges come in contact with each other, and insert the end of one cartridge into the open end of the cartridge below it, so as to form a better contact of the contents and make a more solid charge.

Perryopolis, Penn. R. W. LIGHTBURN.

Americanizing the Foreigner

Letter No. 3—After reading the interesting letter of "Experience," *Coal Age*, Aug. 8, p. 286, which deals with a subject in which I have taken much interest in recent years, I could not refrain from expressing my views, which I hope will be found worthy of publication.

It is hardly necessary to say that the coal-mining element, today, taken as a whole, is inferior both mentally and socially to the old-time Scottish, English, Danish and other nationalities that comprised the mining classes a few years ago. Then the miner took pride in keeping his place in A-1 shape and producing a good tonnage. In those days there was no little rivalry among mine workers, each of whom would strive to gain the notoriety of being the best miner in the camp.

Times have changed, however, and "shooters and loaders" are the substitutes of the old-time miners. This reference is not offered as a criticism of the present-day miner, but is intended merely as a comparison of the conditions brought about by the change in mining methods. The application of scientific principles to coal mining has so revolutionized the coal-mining industry that but a few days' experience is required to enable a man to load a tonnage far in excess of the average daily production in former days. A coal miner today is merely a shoveler of coal, which is cut by machine and drilled by a power auger attached to the cutting machine, after which the coal is blasted down by shotfirers.

These conditions have made it possible for the foreigner, with practically no education and often with little mining experience, to earn good wages in our mines. As a result the bulk of the mining element in this country, today, is comprised of this class, and it can be said truly that we would be handicapped by a shortage of labor, even in normal times, were it not for the foreign classes employed in our mines.

I cannot agree with "Experience," when he states that the work of the executives of coal companies and operating officials has "seemingly failed in its purpose." On the contrary, I think that much lasting good has been done through their efforts. It is my belief that coal executives and officials are not competent judges of the results of their own efforts.

Let me ask such as feel discouraged in this line of work, whether they are not attempting to undo, in a few years, what has been many years in the making. The foreigner is not in his present plight through choice, but is the victim of circumstances and environment. Our desire to Americanize him, by changing his mode of living to which he was born and bred, must be tempered with almost infinite patience and perseverance. Progress will be slow and we must not be discouraged.

WELFARE WORK A NECESSITY AT ALL MINES

To insure the greatest measure of success, efforts to improve the foreigner must not be confined to the larger companies. It is necessary that like efforts be put forth by those in charge of smaller operations. During the past few years, I have frequently noticed the difference in the customs of those foreigners who have been employed at plants where social welfare was in progress, and those where no such efforts were put forth. I have observed that foreigners coming from places where the company was interested in their welfare not only inquired as to the conditions in the mine, but they were particular to find out about the living conditions, and to inquire what schools were available for the children, etc. On the other hand, the foreigner who had not experienced these advantages was only interested in knowing whether a good working place would be given him. Apparently, it mattered little to him what his family might have to endure.

A good illustration of the improvement already made in the mode of living of the average foreigner, today, is that seldom more than two men are observed to occupy the same sleeping apartment, while, formerly, it was a common thing to see from 10 to 15 men accommodated in a three or five-room house. The problem of improving the foreigner would be greatly simplified if it were possible to retain the same employees at one camp. The mine practicing the social uplift of their employees would, then, soon have a higher class of labor than operations where no such work was attempted.

The fact that there are some families among the foreigners whose customs it is difficult to change and whom it is hard to influence is no reason for condemning the foreign classes, since there are just such families born and bred on American soil. We must strive to surround such with improved conditions, in the hope that environment will at last effect a change.

In closing, let me urge all mine officials who feel discouraged after making an honest effort to Americanize their foreign-born employees, to observe the effect their efforts have had on the children. I venture the assertion that some improvement will be there observed.

Rosemont, W. a. J. A. H.

INQUIRIES OF GENERAL INTEREST

Air-Cylinder Lubrication

Will you kindly state, in the columns of *Coal Age* what are the essential requirements in the lubrication of the air cylinder of a compressor. There seems to be a variety of opinions in regard to the best lubricant to use for this purpose. I had supposed that a cylinder oil that gave good results in the steam cylinder would give equally good results in the air cylinder of a compressor, until I found by sad experience that it would not. It is claimed by some engineers with whom I am acquainted that soap and water gives as good results in the lubrication of the air cylinder of a compressor as any of the best lubricants on the market.

Indianapolis, Ind. ENGINEER.

There is hardly any subject connected with the industry of coal mining that requires more constant hammering, in the effort to educate new engineers, than the question of the proper lubrication of the air cylinder of a compressor. As this correspondent has learned by experience, the air cylinder is quite a different proposition from that of the steam cylinder, a different lubricant being required in each case.

Much trouble is experienced in the lubrication of the cylinder of any engine, air, gas or steam, unless the lubricant is adapted to meet the special conditions involved in the operation of such engine. A lubricant that will give excellent results in the steam cylinder will fail absolutely when used in an air cylinder. The same is true in respect to gas engines, which require a lubricant of high flash point.

In colliery practice, in air-compression work, one of the chief difficulties arises from the dust commonly drawn into the cylinder with the air. This dust mixed with the oil used to lubricate the cylinder forms a deposit or sediment that obstructs the air ducts and valves, causing the latter to leak, thereby raising the temperature and making more difficult the lubrication. On this account, a lighter oil having a gravity of, say from 31 to 33 Baumé has been found to give better results than an oil of less gravity. In this respect, air compression at collieries, except where the air is thoroughly washed and cleaned before being drawn into the cylinder, may differ from that in other operations.

In general, it may be stated that the points to be emphasized as matters to be avoided in the lubrication of an air cylinder are the following:

1. Avoid excessive feeding of the oil. Too much oil in the air cylinder will generally give more trouble than too little. Experience in operation must determine the rate of feeding, which may vary from two to three drops a minute.

2. Avoid the use of a heavy oil, which unnecessarily increases the friction, while a lighter oil lubricates with far better results. High viscosity of the lubricant in the air cylinder is objectionable, owing both to the increased deposit of a carbon residuum and the greater adherence of the lubricant to the cylinder walls.

3. Avoid the use of an oil having a flashing point lower than 375 deg. F. In this connection, attention has been drawn to the fact that the flashing point of an oil is determined, in the laboratory, under atmospheric pressure, and is considerably higher under the greater pressure in the air cylinder. In this respect, the flashing point of oil is assumed to be affected by pressure in very much the same manner as the boiling point of water, which rises with the pressure.

4. Prevent, as far as possible, the entrance of dust-laden air into the air cylinder. The trouble resulting from this cause is often attributed to the lubricant, and the continued trial of oils and greases affords no relief.

The dust mixed with the oil forms a residuum that frequently lines the walls of the receiver to a depth of 1 or 2 in. The discharge valves become coated and leak, with the result that much of the air is churned back and forth in the cylinder, causing a rise in temperature, and, perhaps igniting the residue deposited in the receiver and air line. The burning out of this residue has, at times, caused the air line to become red-hot, destroying the gaskets and doing other damage.

In the intelligent operation of an air compressor, it can be said that there is little danger of an explosion taking place in the compressor. Instances on record, where explosions have occurred in the cylinder, have generally been shown to have resulted from improper management. A practice of which a few engineers are guilty and which is extremely dangerous, is that of introducing into the cylinder kerosene or a light volatile oil, for the purpose of cutting out the oily film deposited in the air ducts and valves of the machine. Such an oil having a low flashing point, it would be remarkable if the oil or the vapor was not ignited at once and an explosion follow.

Many good engineers in charge of compressors advocate strongly the use of soap and water, which they claim furnishes as good lubrication as the best cylinder oil on the market, without the attending difficulties experienced with many oils. For this purpose, a good quality of castile soap, or one free from acid, should be used. It can be arranged so that the same soap and water mixture can be used over and over again, as it does not deteriorate except when mixed with impure air.

One engineer states that he has never obtained better results, in air-compression work, than when lubricating with a good quality of lubricating grease, introduced into the air inlet from a grease cup. He claims that he found this method more convenient and giving less trouble than any he had ever used.

The proper lubrication of air cylinders is important, and *Coal Age* will be glad to have this subject freely discussed by engineers, who are invited to state their difficulties and the way they have overcome them.

EXAMINATION QUESTIONS

Kansas Firebosses' Examination Pittsburg, May 15, 1918

(Selected Questions)

Ques.—What is a safety lamp? Describe the essential features on which a safety lamp is based.

Ans.—The words, "safety lamp," as used in coal mining, refer to a lamp the flame of which is protected by a wire-gauze chimney, which allows air to enter the combustion chamber of the lamp but prevents the flame of the gas burning in the lamp from passing out and igniting the gas-charged air outside.

The essential features on which the safety of the lamp depends are the following: (1) The complete isolation of the flame, by means of a perfect gauze of standard mesh (784 openings per square inch), which forms the chimney and covers all openings to the combustion chamber of the lamp. (2) The perfect fitting of all the parts of the lamp when these are properly assembled. (3) The proper proportionment, in size, of the combustion chamber and the lamp chimney. (4) Sufficient protection in the upper portion of the lamp, by means of double gauzes, or a gauze cap or a metal shield or both. (5) A steel bonnet surrounding the chimney of the working lamp. (6) A safe non-volatile oil burned in the lamp. (7) The proper handling of the lamp, in gas, by a competent person.

Ques.—What is firedamp? What are the lowest, highest and maximum explosive points of firedamp?

Ans.—In this country the term "firedamp" refers to any inflammable or explosive mixture of gas and air. Methane or marsh gas unmixed with air is sometimes wrongly called "firedamp." But, to enable this gas to fire, it must be mixed with certain proportions of air, which renders it inflammable or explosive according to the proportion of air present in the mixture, and such a mixture is firedamp.

The *lowest explosive limit* of pure methane and air occurs when the proportion of gas to air is 1:13; or when the mixture contains 7.14 per cent. of gas. The *maximum explosive point* of pure methane and air occurs when the proportion of gas to air is 1:9.57 or when the mixture contains 9.46 per cent. of gas. The *highest explosive limit* of pure methane and air is reached when the proportion of gas to air is 1:5, or when the mixture contains 16.67 per cent. of gas.

Ques.—What is afterdamp? What gases are found after an explosion of firedamp at its maximum explosive point?

Ans.—The term "afterdamp" refers to the variable mixture of air and gases that results from and remains after an explosion of firedamp or dust, in a mine. While its composition is quite variable, owing to the varying conditions under which the combustion takes place, the general composition of afterdamp consists of carbon dioxide, (CO_2), carbon monoxide (CO), nitrogen (N_2), together with some unburned methane and air or oxygen.

The explosion of a firedamp mixture, at its maximum explosive point, produces carbon dioxide (CO_2), water vapor (H_2O) and the unburned nitrogen, (N_2) of the air, in which case the combustion is said to be complete. All of the carbon of the methane then combines with the oxygen of the air to form carbon dioxide and all of the hydrogen of the methane combines with the oxygen of the air to form water vapor, while the nitrogen of the air remains unchanged.

Ques.—What is a dangerous atmosphere?

Ans.—A dangerous atmosphere is one that is poisonous to breathe, or unsafe because it is inflammable or explosive or approaches this condition. Also, an atmosphere is dangerous when it is deficient in oxygen, or when the oxygen content falls below the normal per centage (20.9 per cent.)

Ques.—What are the explosive gases found in mines, and how are they detected?

Ans.—The gases that form an explosive mixture with air are methane or marsh gas (CH_4) and carbon monoxide (CO). While olefiant gas (C_2H_4) and hydrogen sulphide (H_2S) are explosive when mixed with air, these gases do not occur in sufficient quantities, in mines, to consider them separately.

Methane or marsh gas is detected, in mine workings, by observing its effect on the flame of a safety lamp. A small percentage of this gas causes the flame to "spire" or lengthen. As the percentage increases, the flame becomes unsteady and increases in volume. This effect depends largely on the quality of the gas and is more observable when olefiant gas is present. In a Davy lamp, a gas cap is observed above the flame of the lamp when 2 or 2½ per cent. of gas is present in the air. The height of this cap increases with the increase in the proportion of gas.

Carbon monoxide, when present in the mine atmosphere, is detected by observing its effect on small caged animals such as birds and mice, which show signs of prostration much quicker than a person exposed to the same atmosphere. This is the safest and most reliable means of detecting the presence of this gas in the mine.

Ques.—How would you carry your safety lamp when entering a known dangerous place in the mine?

Ans.—Proceed slowly and with caution, holding the lamp in an upright position near the roof, stopping at short intervals to make a careful test of the air. To do this the current flowing at the roof must be disturbed, by a slight motion of the hand or by blowing against the roof so that the gas will descend to the lamp, which should be held in an upright position close to the roof, and not turned on the side, as is the practice of some firebosses. Care must be taken never to swing the lamp, and to protect it against strong air currents, especially when advancing against the air.

COAL AND COKE NEWS

Harrisburg, Penn.

The Federal Trade Commission has accepted the proposal of the Anthracite Consumers' League to investigate the cost of anthracite coal, with a view to a reduction in price if the profits are regarded as exorbitant. In a letter to Hon. Frank C. Reese, the Commission declares it will be glad to receive all the information in the hands of the league as to the cost per ton of coal. The league has demanded that the price be reduced in September instead of raised, as coal at present prices is producing big earnings over expenses. One of the practices of the coal companies to which the league particularly objects is that of billing deteriorated coal reclaimed from the refuse banks at prices which obtain for fresh mined coal. It is alleged that the coal from the banks is being produced at a cost of little more than 25c. a ton.

Uniontown, Penn.

Inspection of coke shipments from all regions in the country, with an established basic price for low-grade coke in prospect if that measure does not substantially improve the quality of coke being delivered to the foundries, was inaugurated in the Connellsville coke region following the conference with 200 operators here of Warren S. Blauvelt, coke director for the United States Fuel Administration. R. C. Glazier, of Johnstown, a practical furnace man and coke expert in the employ of the Cambria Steel Co., has been named chief coke inspector and has already assumed his duties at Washington.

Should the projected inspection system not produce the desired improvement in the quality of coke, Mr. Blauvelt told the operators a basic price of $5 per ton would be established for low-grade coke, which would in effect be a penalty of $1 per ton for its foreign content. There will be no change in the fixed price of $6 for coke, he said, but if the two prices are established, the present figure will represent the selling price of first grade coke passed by Mr. Glazier's inspectors.

For some time the fuel administration has contemplated some measure looking toward the improvement in quality, Mr. Blauvelt stated, and told the operators that the recent meeting of the country's steel men in Washington when the steel needs of this country and the Allies were outlined precipitated action. He said that the furnaces were not producing the tonnage of metal in proportion to the quantity of coke delivered and had found after thorough investigation that the trouble lay principally in the quality of the coke.

Charleston, W. Va.

Labor Day coming in the first week of September did not make for a propitious production start for the month, not only because of the holiday itself but because of the aftermath. Nevertheless West Virginia coal men were sanguine that they would not have to contend during September against the paucity of cars which retarded production so much during August. Whatever the claims of the railroads may be as to why there was a decrease in production in the West Virginia fields during August, those in touch with conditions know that it was meager transportation facilities which prevented the industry from going ahead in production. However, as a result of the representations made by production officials in various West Virginia districts, it is believed that most of the West Virginia mines will receive in the future close to a 100 per cent. car supply. At the same time no company will be furnished any more cars than it can possibly load.

Some impetus was given to production in the Fairmont field during the last week in August and the first week in September by a better car supply, but late placing of cars and two holidays—Sunday and Labor Day—tended to make it impossible to get away to a flying start during the month. The district had on Saturday, Aug. 31, 969 cars, which was somewhat in excess of the usual Saturday supply. However, not all of the supply available was placed in time to make full loading possible. Indeed, late placing has brought to a focus the question of what constitutes "cars available." operators contending that cars in yards but not in sight for loading, as it were, should not be classed as available cars. An extra number of cars were asked for Saturday in order that some of the mines might be operated Saturday night but the additional supply was not forthcoming.

In the Kanawha District, Labor Day reduced the usual output a sixth or nearly so, and of course made it impossible to forge ahead at the outset of September. Mines on Cabin Creek were unable to muster their full complement of men for several days after Labor Day. On Coal River Labor Day did not interfere with production, miners going right ahead despite the fact that it was a holiday. Cars were plentiful for several days following Labor Day, but since the railroads had had several days in which to accumulate a supply the operators could not be certain as to whether the supply would be maintained.

With both miners and operators joining in the production movement in the Tug River and Pocahontas regions, a spurt in production was recorded during the week ending Aug. 24, a gain of 8961 tons being recorded. For the period mentioned the total production was 446,507 tons as against 437,546 tons for the previous week. While cars were somewhat more scarce, still only 109 hours were lost because of such a shortage, that loss being met in part by a small margin of a gain in the number of hours worked, the total time the mines worked being 7368 hours. From all causes there was a tonnage loss of 48,592, or something like 7000 tons less lost than for the week preceding. The two districts combined showed a total of 47,714 tons of coke produced.

Birmingham, Ala.

Coal production on Monday, Sept. 2—Labor Day—was up to normal. Miners and mine employees disregarded the great labor holiday, or rather marked it by unusual effort on their part to produce a maximum quantity of coal, and the announcement of their intention to put in a full day's work resulted Saturday, Aug. 31, in an order by local representatives of the Railroad Administration to have all needed cars at the mines Monday, and rail facilities were ample to handle the output.

While there are some mines which reported a loss of a day or two during the week as a result of car shortage, the production for the week ended Aug. 31 promises to be most satisfactory. For the four weeks starting with the week ending Aug. 3 and including the week ending Aug. 24, the coal production in this state has amounted to 421,532 tons a week.

It is estimated that the output at the mines for the last week in August will go 10,000 tons above this figure. If the production can be kept around 431,000 tons a week it would bring the rate of production to approximately 22,412,000 tons for the year. It is believed the maximum production of 433,738 tons recorded during the week ending July 27 will be exceeded. If this is realized it will bring about a recovery in the loss in output suffered during the first six months of the year and provide for a possibility of equalizing the production of last year, which amounted to 20,413,811 tons.

The fact that coal production is being kept at top speed is having a noticeable effect on the coke production in this district, which according to reports this week is holding up remarkably well. The government has started compiling statistics on coke production in this district which will be announced at regular intervals.

Vancouver, B. C.

The price of domestic lump has been raised from $8.80 a ton to $9.50 by most of the retail dealers. This increase, it is assumed, is the result of the recent action of the Canadian Fuel Controller in permitting certain of the Vancouver Island collieries to raise their selling prices. The view taken by the controller on the occasion in question was considered rather unusual, inasmuch as he authorized a maximum selling rate of $6.55 a ton to all the Island mining companies with the exception of the Canadian Western Fuel Co., which was not sanctioned to raise its quotations beyond the maximum which had previously prevailed—namely, $5.80 a ton. The explanation given was that investigation had proved that owing to circumstances over which they had no control, all other collieries were subject to greater production charges than the Canadian Western Fuel Co. and that the latter was the only one which was making what might be considered a fair profit on the capital investment. The Vancouver public, however, takes the position that dealers handling Canadian Western Fuel Co. coal, as well as others, have raised prices and that some must have gone beyond the power given them by the controller when he set their maximum profits at 50c. a ton. It is suggested that an investigation is in order.

The July tonnages for British Columbia are most encouraging, as the figures show that the production is holding with the pace set at the beginning of the year and indicate that there is a good chance that the Province will, when the statistics are compiled at the end of the twelfth month, be found to have outstripped all previous records. Following is the production in tons of the various collieries for the month:

	Tons
Crows Nest Pass Coal Co., Coal Creek	37,992
Crows Nest Pass Coal Co., Michel	19,407
Corbin Coke and Coal Co., Corbin	13,454
Middlesboro Collieries, Merritt	7,988
Fleming Coal Co., Merritt	3,504
Coalmont Colliery, Coalmont	347
Princeton Colliery, Princeton	3,145
Canadian Western Fuel Co., Nanaimo	61,563
Canadian Collieries (D) Ltd., Comox	46,698
Canadian Collieries (D) Ltd., Extension	18,650
Canadian Collieries (D) Ltd., South Wellington	2,122
Pacific Coast Coal Mines, South Wellington	6,775
Nanoose Colliery, South Wellington	2,285
Granby Colliery, Cassidy's	2,718

It will be noted that there are three mines on the producers' list which have not been there for some time, two of which have been newly opened. The latter are the Canadian Collieries' mine at South Wellington, which has 2122 tons to its credit, and the other the Granby Mine at Cassidy's with a production of 2718 tons. These, while comparatively small at present, will grow and no doubt will become a material factor in British Columbia's coal output. The Coalmont Colliery is the other referred to and, although it starts with the modest tonnage of 347 tons for the month, more may be expected of it in the near future.

PENNSYLVANIA

Bituminous

Uniontown—The Connellsville coke region for the week ending Aug. 24 set a new high record for coal production. The tonnage for the week aggregated 716,954 tons, a greater output than has been recorded since the compiling of statistics was commenced by the Fuel Administration. Coal reduced to coke aggregated 335,214 tons, a gain of 11,133 tons, while coal shipments amounted to 214,133 tons, an increase of 24,099 tons. An improved car supply and mild weather conditions were mainly responsible for the excellent showing, but the labor supervising system was also a factor in the increase.

In order that the 200 coal miners in the Connellsville coke region may be supplied with electric power, the War Industries Board, through the local fuel administration, has ordered that all day power be discontinued at nonessential plants in this section. This action makes certain that the mines will receive "juice" and assures a larger output of coal and coke, so necessary to steel manufacture.

Cost sheets from all thin-vein coal operators must be submitted to the fuel administration before any action is taken on the application for an increase in fuel price on such coal in Fayette County. This report was made to the thin-vein operators at a meeting held in Uniontown by the committee named at a previous meeting.

Uniontown—Phillip Colliery, an Italian employed by the Republic Iron and Steel Co., drew $327.25 for 14 days' work, an average of $23.38 a day. Between Aug. 16 and 31, he loaded 374 cars. He is 5 ft. 4 in. in height, weighs 160 lb. and is married. Until this record he was averaging about $80 per week.

Berlin—Harry Pyle, a coal miner, is believed to have broken all records of earnings in war-times by drawing $516.10 for 26 consecutive days' work in the mines. This miner works in the thin vein of coal, where only pick mining is pursued. Pyle is employed at the Blande mine of the McGregor Coal Co. During a period of 26 days, beginning July 16, and ending Aug. 15, Pyle mined 410 long tons, excavated 44 yards of entry, for which he received $4, and put in two hours on outside labor.

Brownsville—The Elliott Estate tract of coal properties, totaling about 300 acres, has recently been acquired by Julian Kennedy and associates at a price said to be about $2200 an acre. It is understood that the new owners will operate the property.

Fredonia—A vein of coal has been located on the Sherman Harsh farm, near here. Stoneboro parties have secured leases on this and adjoining farms and are having tests made to sink a shaft. The vein is reported to be from four to six feet thick.

Anthracite

Minersville—The Lytle Coal Co. has started a series of first-aid contests. This marks the ninth annual drill of its kind, the contests being held after quitting time at the various collieries during the month of September.

Hazleton—Figures made available on Sept. 4 show that fuel production for August in the Lehigh region was considerably ahead of that of the same month last year. Officials of the Lehigh Valley Coal Co., the largest producer in the field, estimate that its total would run 25,000 tons over August, 1917. The daily output of the valley now averages between 8500 and 9000 tons.

Harleigh—Some of the women are helping their husbands load coal from the abandoned slate banks at nearby collieries in efforts to increase the output of anthracite. They are doing the work voluntarily in order that the monthly pay envelope may run above the usual average and at the same time are giving the Government a lift.

Shenandoah—The Locust Mountain Coal Co. has had plans drawn for a number of 1½-story residences for employees at its properties. The structures will be of the three-family type.

WEST VIRGINIA

Charleston—Following complaints of the Kanawha Coal Operators' Association to the Fuel Administration for the lack of cars in the Kanawha Valley mining section, the Chespeake & Ohio R. R. has been instructed to keep a supply of cars on hand at the mines at all times.

Elkins—Extensive improvements have been made at the plant of the Edward O'Toole (trustee) Co.'s plant in Barbour County, the company having installed a generating plant, two mining machines, a 13-ton locomotive, electric pump. New mining cars have also been added to its equipment.

Arden—The Lee Collieries Co. will extend its operations by opening another mine a mile or so from the company's present operation at Arden, and as a forerunner of operations there will put up miners' houses. At the Arden plant a new tipple has just been completed and put in commission.

Buckhannon—In addition to building a number of houses for miners, the Buck Coal Co. is putting in new scales at its Lorentz plant. A new store and office building has also been added to the plant.

Clarksburg.—In connection with the opening of a drift mine in Harrison County by the Catherine Coal Co., it is learned that the company plans to have a mine with a capacity, when completed, of 50,000 tons per year, work having already been started on this plant, which will be ready for operation by Oct. 1st. The superintendent of the company is C. S. Hornor, of Clarksburg.

Philippi—Coal is now being shipped from the plant of the Wolf Coal Co., located near this place. Construction work was recently completed on this plant.

Progress is being made by the Buckeye and West Virginia Coal Co. at Lorentz in the installation of new machinery under the direction of Superintendent O. M. Malcolm.

The Meadowvale Coal Co. whose plant is at Arden, will be ready for operations within a short time, the plant having been completed. A number of houses for miners have also been built.

The Ford Run Coal Corporation, with a plant at Meriden, has erected a tipple at its No. 6 mine where it will begin producing coal in a short time. Lee J. Sandridge is general manager, being also largely interested in the company.

Grafton.—The Gaymont Coal Co. has decided to depend upon its own power and the directors of the company have authorized the construction of a power plant at Bolder, where the company has its plant. The operating official in charge is B. C. Cence.

Just as soon as a siding which is now being laid is completed, the Cordell Coal Co. hopes to be able to begin the shipment of coal from its new plant at Wilt. At this point the company has a thick vein of Pittsburgh coal to mine. J. J. Delaney will be in charge of operators.

ALABAMA

Birmingham—The Big Four Mines, near North Birmingham, have been acquired under lease by the Sandstone Coal Mining Co., operating in this district. The present capacity of the plant, aggregating 125 tons a day, will be increased, and extensive development work inaugurated. W. M. Holt is president.

Birmingham—John Pennington, white, and Jack Jones, colored, were killed, and a number of other mine employees placed in jeopardy, when the Mary Lee mine of the Alabama Co. was flooded on the afternoon of Sept. 2. A heavy rain approximating a cloudburst swelled a branch near the mouth of the slope beyond its banks, the water pouring into the slope and manway and carrying everything before it. All other mine workers are thought to have been rescued. The slope tracks and retaining walls at the entrance to the mine were inundated and washed away, as was also the approach to the manway, the property damage amounting to several thousand dollars. At the time of the accident most of the employees, numbering about 400, had finished their tasks and come to the surface.

Delmar—The Glen Mary Coal Co., operating in the Natural Bridge section, has acquired about 400 acres of land adjoining its properties, and plans for extensive development work for increased output.

KENTUCKY

Greenville—O. C. Evans, operating local coal properties, is planning for the installation of new electric equipment at his mine.

OHIO

Martins Ferry—Work is progressing in the opening of the new mines of the Y. & O. Coal Co. on Little Short Creek, west of Rayland on the Wheeling & Lake Erie R. R. The tracks leading to the mines are being graded and two steam shovels are at work cutting away the hillside and filling in the hollows. Several miles of track will be necessary to reach the proposed openings. A town is to be laid out on the site and already several houses are under construction.

Gloucester—Fire recently destroyed all the buildings at the Hunterdon mine of the Ohio Valley Collieries Co.

Coshocton—George Sloan, of Zanesville, who recently purchased the Edward Nash farm near Adamsville from G. H. Lapp, has sold the property to Lloyd Amore of Coshocton, who expects to begin work on the development of a coal mine.

ILLINOIS

Alton—Prolonged drought, only recently broken, enabled the reclamation of abandoned workings in Coal Branch, on the outskirts of Alton. These plants had been abandoned for several years on account of the encroachment of water. During the drought it was discovered that the water had receded, and arrangements have been made to resume operation of several of the pits. When they were abandoned they could not be operated profitably, both on account of the comparatively limited output and the water difficulties, but money can be made out of them now by supplying the local demand. W. T. Davies has a force of men getting pits on the James Wilson property ready for producing. Precautions will be taken against renewed flooding of the workings.

Hillsboro—A report that after Sept. 1 the mines in this vicinity would not be permitted to supply local consumers caused a run on the mines in the closing days of August. Vehicles of every description were pressed into service by anxious consumers, who stood in line for hours at the mines. The mine managers say, however, that they have not yet received orders to withhold coal from local consumers.

IDAHO

Coeur D'Alene—Work has been started by the Oregon Short Line Railway Co. on the construction of a 12-mile branch from its main line to the coal mines of the Brown Bear Coal Co., in Teton County. The branch will run from Driggs to Teton. R. C. Talbot is manager for the coal company.

WASHINGTON

Chehalis—D. W. Proebstel, electrical engineer for the Port'and Railway, Light and Power Co., Portland, Ore., is here while superintending the installation of electrical machinery at the plant of the Superior Coal Co. The equipment will consist of an electrical hoist, said to be the largest in the state, an electrical locomotive to haul the coal to the foot of the 1600-ft. entrance slope, and an electrically driven conveyor to the tipple. T. R. Campbell is manager of the mine and states that when the equipment is installed the operation will be producing about 400 tons a day.

Seattle—The school board has accepted the bid of the Hyde Coal Co. at $4 per ton for 1250 tons of steam coal and that of the Roslyn Coal Co. at $3.30 per ton for 1000 tons of mine-run.

Spokane—Preliminary development work is being undertaken by the Colville Valley Coal Co. on its property, which consists of 320 acres at Valley, near this city. The coal vein is contained within sandstone and shales. A shaft 300 ft. deep has been driven on the vein, which is 6 ft. wide, and according to the company geologist contains 10 per cent. moisture, 14 per cent. ash, 37 per cent. volatile combustion and 38 per cent. fixed carbon. Frank Weatherwax, of Valley, is president of the company; A. N. Cantril, secretary-treasurer. The company is considering putting in a 60-ton capacity briquetting plant.

Tacoma—An explosion at the Burnett mine of the Pacific Coast Coal Co. on Aug. 28 cost 12 miners their lives and seriously injured three others, 170 who were at work in the mine escaping unhurt. At this writing the cause of the explosion is undetermined. It is believed that the explosion, which occurred at 4:30 p. m., was due either to gas or a "shot" of dynamite that went wrong. State Mine Inspector Bagley believes that dust was undoubtedly a contributing factor in either case.

Foreign News

Victoria, B. C.—During the first six months of the present year coal production in British Columbia has reached the total of 1,375,230 tons, or 247,922 tons in excess of that produced for the same period of last year. The tonnage produced in the three districts is as follows: Crowsnest Pass, 404,472 tons, Nicola-Princeton, 109,483 tons; Vancouver Island, 861,314 tons.

Personals

J. F. Healy, of Huntington, W. Va., for nearly three years allotment commissioner for the Chespeake & Ohio, has resigned to become manager of the Reliance Coal and Coke Co., of Kentucky, with office at Glomar, near Hazard. Mr. Healy will continue to reside in Huntington.

F. K. Day, chief engineer of the West Virginia division of the Consolidation Coal Co., of Fairmont, W. Va., has been granted a furlough for the duration of the war. He has been appointed assistant production manager for northern West Virginia by James B. Neale, director of production of the Fuel Administration.

W. T. Lacey, of Harrisburg, Penn., has assumed charge of the Birmingham (Ala.) Mine Rescue Station of the United States Bureau of Mines, succeeding W. T. Burgess, who has been superintendent of the station for some time. Mr. Burgess resigned recently to accept the position of superintendent of the Belle Ellen mines of the Bessemer Coal, Iron and Land Co.

Austin Riggs, assistant division engineer of the West Virginia division of the Consolidation Coal Co., of Fairmont, W. Va., has been appointed division engineer, to succeed F. K. Day, who has been furloughed to the United States Fuel Administration,

as mentioned elsewhere in these columns. Mr. Riggs has been in the employ of the Consolidation company for seventeen years. The position of assistant division engineer will not be filled at this time.

Obituary

William Cameron, Secretary of the St. Louis Coal Traffic Bureau, and chairman of the freight committee of the eastbound lines, died a few days ago at Denver, Colo., where he had gone in the hope of benefiting his health. He was stricken in July and spent a month in a sanitarium before going to Denver. The body was brought to St. Louis, Mo., for interment. Mr. Cameron had a wide acquaintance among coal men.

Publications Received

Thirty-Sixth Annual Coal Report of Illinois. Department of Mines and Minerals, 1917. Unillustrated, 302 pp., 6 x 9 inches.

Report of the Department of Mines of Pennsylvania. Part I—Anthracite, 1916. Commonwealth of Pennsylvania. Unillustrated, 900 pp., 6¼ x 9¼ inches.

Report of the Department of Mines of Pennsylvania. Part II—Bituminous, 1916. Commonwealth of Pennsylvania. Unillustrated, 1404 pp., 6¼ x 9¼ inches.

Monthly Statement of Coal Mine Fatalities in the United States, May, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 23 pp., 6 x 9 inches.

The Tars Distilled from Bituminous Coal in Hand-Fired Furnaces. By S. H. Katz. Department of the Interior, Bureau of Mines. Technical Paper 195. Illustrated, 17 pp., 6 x 9 inches.

A Convenient Multiple-Unit Calorimeter Installation. By J. D. Davis and E. L. Wallace. Department of the Interior, Bureau of Mines. Technical Paper 91. Illustrated, 47 pp., 6 x 9 inches.

Annual Report on the Mineral Production of Canada During the Calendar Year 1916. John McLeish, B. A., Chief of the Division of Mineral Resources and Statistics. Canada Department of Mines, Mines Branch. Unillustrated, 343 pp., 6½ x 9¾ inches.

Methane Accumulations from Interrupted Ventilation, with Special Reference to Coal Mines in Illinois and Indiana. By Howard I. Smith and Robert J. Hamon. Department of the Interior, Bureau of Mines. Technical Paper 190. Illustrated, 42 pp., 6 x 9 inches.

Trade Catalogs

Jeffrey 35 B—Shortwall Mining Machine. The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 241. Pp. 12; 6 x 9 in.; illustrated. Features the latest type of Jeffrey shortwall coal cutter.

Jeffrey Electric Rotary Coal Drills. The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin 243. Pp. 12; 6 x 9 in.; illustrated. Describes the A-5 electric rotary drill for drilling in any material which can be penetrated with an auger bit.

Sullivan Straight-Line Air Compressors, Sullivan Machinery Co., Chicago, Ill. Circular 58-W. Pp. 30; 6 x 9 in.; illustrated. Instructions for the installation and operation of classes WA-3 and WA-4 (steam driven) and WG-3 and WG-4 (belt driven) compressors.

The Lincoln Wheel for Mine Cars. Lincoln Steel and Forge Co., St. Louis, Mo. Bulletin 102. Pp. 12; 9 x 11½ in.; illustrated. This bulletin is in convenient form for filing and calls attention to the many points which make the Lincoln wheel meet the approval of the operator.

Condensers, Pumps, Cooling Towers, Etc. Wheeler Condenser and Engineering Co., Carteret, N. J. Bulletin 112-A, pp. 32; 8 x 10½ in.; illustrated. Describes condensers and condensing machinery. One page is devoted to the Wheeler feed water heater and two pages to multiple effect evaporators and dryers.

C-H Iron-Clad Solenoids. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Booklet F. Pp. 4; 8½ x 11 in.; illustrated. Describes solenoids particularly adapted for operating brakes used in connection with crane, elevator and hoist motors. Booklet lists four sizes and gives the stroke, gross pull, dimensions, weights and other interesting data.

Bulletins. Electrical Engineers Equipment Co., Chicago, Ill. Illustrated, 8 x 11 in. The loose-leaf bulletins contained in this binder give a complete description of all the products manufactured by this company. All information and illustrations have been prepared with the idea of making the selection of the proper apparatus as simple as possible for prospective buyers.

Recent Coal and Coke Patents

Safety Stop for Mine Cars. S. Verbitisky, St. Clair, Penn., 1,269,983. June 18, 1918. Serial No. 214,297.

Furnace. C. Zulver, London, Eng., 1,270,679. June 25, 1918. Filed June 25, 1917. Serial No. 176,854.

Boiler. E. C. Meier, Phoenixville, Penn., 1,263,586. Apr. 23, 1918. Filed May 10, 1917. Serial No. 167,840.

Stoker. W. A. Casler, Louisville, Ky., 1,263,035. Apr. 16, 1918. Filed Mar. 23, 1915. Serial No. 16,454.

Ash Sifter. Kempler, Newburgh, N. Y., 1,270,166. June 18, 1918. Filed Dec. 21, 1917. Serial No. 208,246.

Holder for Miner's Lamps. J. M. Roberts, Fredonia, Ky., 1,271,368. Filed Oct. 13, 1917. Serial No. 196,433.

Mine Apparatus. J. Chabala, Cuddy, Penn., 1,271,777. July 2, 1918. Filed Feb. 9, 1918. Serial No. 216,277.

Smoke Purifier. W. L. Boyd, Hayden, Ariz., 1,263,197. Apr. 16, 1918. Filed May 12, 1917. Serial No. 168,182.

Dumping Car. C. O. Flowers, Flint, Mich., 1,271,303. July 2, 1918. Filed July 17, 1917. Serial No. 181,118.

Bottom Dump Car. O. G. Petersen, Somerset, Ky., 1,263,285. Apr. 16, 1918. Filed July 3, 1916. Serial No. 107,295.

Stoker Bridge. P. L. Crowe, New York, N. Y., 1,262,647. Apr. 16, 1918. Filed Aug. 5, 1914. Serial No. 855,105.

Locomotive Boiler. J. G. Broman, Chicago, Ill., 1,263,844. Apr. 23, 1918. Filed Apr. 24, 1916. Serial No. 83,149.

Coal Mine Drill. J. A. Walker, Springfield, Ill., 1,271,396. July 2, 1918. Filed Nov. 10, 1916. Serial No. 611,603.

Mechanical Stoker. H. E. Kleffel, New York, N. Y., 1,270,171. June 18, 1918. Filed Nov. 16, 1917. Serial No. 202,374.

Coal Car Cover. G. B. Miller, Gloversville, N. Y., 1,270,646. June 25, 1918. Filed Mar. 15, 1918. Serial No. 222,664.

Signal for Mine Railways. J. A. Muir, Smithboro, Ill., 1,274,072, July 30, 1918. Filed Mar. 23, 1916. Serial No. 86,129.

Stoking Apparatus. J. H. Cooper, Pittsburgh, Penn., 1,264,369. Apr. 30, 1918. Filed June 30, 1914. Serial No. 37,165.

Safety Mine Cage Device. J. Matthews, Plymouth, Penn., 1,268,260. June 4, 1918. Filed Apr. 14, 1916. Serial No. 91,160.

Miner's Combination Tool. W. W. Weber, Fort Myers, Fla., 1,263,720. Apr. 23, 1918. Filed Oct. 19, 1917. Serial No. 197,450.

Coal Elevator and Loader. J. Chabala, Cuddy, Penn., 1,263,528. Apr. 23, 1918. Filed Nov. 14, 1917. Serial No. 201,962.

Adjustable Coal Boring Auger. F. W. Armstrong, Clinton, Ind., 1,270,092. June 18, 1918. Filed Apr. 15, 1916. Serial No. 91,407.

Brake for Uphauls for Mines. W. J. Mow, Grass Valley, Cal., 1,274,071, July 30 1918. Filed May 18, 1917. Serial No. 169,555.

Water Back Construction for Furnaces. F. A. Hurlburt, Kansas City, Mo., 1,269,083. June 11, 1918. Filed June 24, 1916. Serial No. 105,725.

Self-Feeding Device for Furnaces. J. H. Turnbull, Edmonton, Alberta, Can., 1,262,876. Apr. 16, 1918. Filed May 16, 1917. Serial No. 169,119.

Mining Machine. E. C. Morgan, assignor to American Morgan Co., Chicago, Ill., 1,271,197. July 2, 1918. Filed May 28, 1904. Serial No. 210,174.

Boiler Furnace. A. C. Mott, Jr., assignor to Abram Cox Stove Co., Philadelphia, Penn., 1,262,229. Apr. 9, 1918. Filed July 10, 1917. Serial No. 179,678.

Chain Grate Stoker. W. W. Holland, J. R. Carringer and W. Bacheldor, Woodriver, Ill., 1,268,845. June 11, 1918. Filed Jan. 12, 1918. Serial No. 211,528.

Roller Bearing Mine Car Wheel. J. L. McDowell, assignor to American Car and Foundry Co., New York, 1,256,149. Feb. 12, 1918. Filed Sept. 5, 1917. Serial No. 189,861.

Forced Draft Furnace Grate. L. H. Simmons, assignor to Simmons Forced Draft Co., Goldsboro, N. C., 1,270,065. June 18, 1918. Filed Jan. 30, 1917. Serial No. 145,442.

Feeding Mechanism for Gas Producers. C. W. Lummis, assignor to Morgan Construction Co., Worcester, Mass., 1,270,962. July 2, 1918. Filed Mar. 10, 1916. Serial No. 83,396.

Roller Bearing Mine Car Wheel. F. Helmick, assignor to Helmick Foundry and Machine Co., Fairmont, W. Va., 1,270,155. June 18, 1918. Filed Apr. 16, 1918. Serial No. 228,934.

Shaking and Dumping Device for Furnace Grates. H. W. Dockray, assignor to Dockray Brass and Iron Co., Zanesville, Ohio, 1,270,126. June 18, 1918. Filed Nov. 17, 1917. Serial No. 202,619.

Industrial News

Barbourville, Ky.—The Trace Branch Coal Co. has increased its capital from $1500 to $5000.

Louisville, Ky.—The Collins Mining Co., of Lackey, has increased its capital from $20,000 to $50,000.

Chicago, Ill.—The Lakewood Engineering Co. has opened new offices in Chicago in the Lumber Exchange Building.

Richmond, Va.—The Bens Run Coal Co. has been incorporated with a capital of $50,000 to develop coal mines at Hyer in Braxton County.

Prestonsburg, Ky.—The Anchor Coal Co. has increased its capital stock from $10,000 to $20,000, to take care of planned improvements to its workings.

Louisville, Ky.—The Walnut Coal Co. has been incorporated with a capital of $3000. The incorporators are W. F. Burwinkle, J. S. Miller and R. E. Godon.

Madisonville, Ky.—The Richland Coal Co. has been incorporated with a capital of $9000. John G. Salmon, Tom Logan and C. M. Logan are the incorporators.

Pineville, Ky.—The Greasy Gap Coal Co. has been incorporated with a capital of $25,000. The incorporators are I. Glickman, Lewis Jones and Morris Euster.

Columbus, Ohio—The S. M. Hudson Coal and Coke Co., of Steubenville, has been incorporated with a capital of $200,000. S. M. Hudson is the principal incorporator.

Indianapolis, Ind.—The Lincoln Coal Co., of Lincoln City, has been incorporated with a capital of $15,000. David Ellison, C. F. Wilson and M. P. Dixon are the incorporators.

Louisville, Ky.—The Farris Coal Co., of East Bernstadt, has been incorporated with a capital of $2000. The incorporators are W. R. Ballou, B. B. Farris and James Farris.

Dover, Del.—The Garfield Coal Co. has been incorporated with a capital of $100,000. The incorporators are John C. Draper, C. L. Rimlinger and F. A. Armstrong, of Wilmington.

Big Chimney, W. Va.—Improvements on a rather extensive scale will be made to the plant of the Empire Coal Co. at this place, just as soon as material and equipment can be secured.

Louisville, Ky.—The Uniontown Coal Co., of Henderson, has been incorporated with a capital of $100,000. The incorporators are C. C. Potter, Dandridge Spotswood and J. H. Turner.

Spokane, Wash.—The Colville Valley Coal Co. has filed articles of incorporation with a capital of $100,000. J. E. Rudersdorf, A. W. Doland and A. N. Cantrell are the incorporators.

Cleveland, Ohio—The Elm Coal Co. has been incorporated with a capital of $1000. E. L. Maag, Frank H. Maag, H. W. Stohlmann, Fred Maag and John H. Reik are the incorporators.

Philippi, W. Va.—The Byrer Coal Co. is preparing to enlarge its capacity by the installation of new equipment, the company also having under construction more houses for miners.

Louisville, Ky.—The Baird Jellico Blue Gem Coal Co., of Gatliff, has been incorporated with a capital of $1000. The incorporators are I. C. Bryant, L. D. Baird and Charlotte Baird.

Oklahoma City, Okla.—The Banner Coal Co., of McAlester, has been incorporated with a capital of $10,000. W. E. Beaty, R. E. Jones, L. C. Cramer, all of McAlester, are the incorporators.

Charleston, W. Va.—The Gauley Mountain Coal Co. has added to its equipment by purchasing two rotary conveyors among other new machinery. R. H. Harris is the manager at this operation.

Louisville, Ky.—The Elkhorn and Jellico Coal Co., of Whitesburg, has been incorporated with a capital of $50,000. M. K. Marlowe, P. E. Marlowe and James Marlowe are the incorporators.

Louisville, Ky.—The Kentucky River Mining Co., of Cannell City, has filed articles of incorporation with a capital of $3600. W. E. Bach, W. L. Day and T. J. Barr are the incorporators.

Tulsa, Okla.—The Gunther City Coal Mining Co., of Tulsa, has been incorporated with a capital of $150,000. The incorporators are S. A. Gaskill, of Claremore, A. C. Gunther and E. A. Vernon, of Tulsa.

Columbus, Ohio—The Packard Coal Mining Co., of Columbus, has been incorporated with a capital of $50,000. The incorporators are M. L. Yuster, Richard Patton, E. E. Fox, W. J. Etchen and C. F. Bookman.

Charleston, W. Va.—With a view to extending operations the Long Branch Coal Co. has trebled its capital stock from $50,000 to $150,000. The operation of this company is at Long Branch, Fayette County.

Canton, Ohio—The Albert Coal Mining Co. has been chartered with a capital of $95,000 to mine coal. The incorporators are John D. Gardner, Charles K. Welch, W. J. Bentram, John O. Cole and A. R. Milner.

Pittsburgh, Penn.—The Charles T. Topping Machinery Co. has merged its interests with the Pittsburgh office of the Lakewood Engineering Co., Cleveland, Ohio, manufacturers of construction plant and industrial haulage.

Charleston, W. Va.—The American Eagle Colliery Co., recently incorporated with a capital of $600,000, is planning for the development of coal properties in this vicinity. L. V. Black and George S. Couch head the company.

Louisville, Ky.—The Central Kentucky Block Coal & Mineral Co., of Hawesville, has filed articles of incorporation with a capital of $200,000. Charles E. McDavitt, Harry Myers and Stanley Allen are the incorporators.

Indianapolis, Ind.—The Elk Run Coal and Mining Co., of Hymera, has been inporated with a capital of $150,000. The incorporators are George E. Elkins, Joseph L. Hampson, Forrest Chenoweth and Luepo D. Buenting.

Nelsonville, Ohio—The Athens-Hocking Coal Co. has been incorporated with a capital of $35,000 to mine and sell coal. The incorporators are Frank Brown, A. P. Stedem, Rudolph Brown, J. W. Wion and Ira Blackstone.

Cleveland, Ohio—The P. & M. Coal Co. has been incorporated with a capital of $75,000 to mine and sell coal. The incorporators are Philip M. Platten, S. H. Holding, Tracy H. Duncan, May E. Gardner and B. M. Parker.

Salem, Ore.—The Fern Valley Coal Co., of Medford, has been incorporated with a capital of $5000. The incorporators are Leonard Carpenter, Frederick H. Cowles, Alfred S. V. Carpenter, Waldo W. Williard and Lincoln McCormack.

Cincinnati, Ohio—The Lawrence County Coal and Clay Co., of Ironton, has been incorporated with a capital of $10,000. Chester Pendleton, Huldah Brucklacher, A. E. Kerns, Garnet Roberts and Grover C. Mills are the incorporators.

Corinth, W. Va.—The Freeport Coal Co. is planning for extensive improvements at its plant to increase the present capacity. The company recently filed notice of an increase in its capitalization from $25,000 to $100,000, to provide for this work.

Madisonville, Ky.—The Finley Coal Co., capital $10,000, has been chartered at Madisonville to operate coal mines. The incorporators are Thomas E. Finley, Mrs. Finley and Dr. C. B. Johnson, the latter of Earlington, these three holding all of the stock.

Louisville, Ky.—The Union County Mining Co. has been incorporated with a capital of $200,000. Fred Reiss, William Jarvis and R. F. Peters are the incorporators.

Charleston, W. Va.—The Kanawha Collieries Co., which will mine coal in Nicholas County, perfected its organization this week by electing W. G. Conley, president; Edward Gebhart, vice president and H. P. Tompkins treasurer and general manager.

Princeton, Ky.—The Betsey Mining Co., recently incorporated with a capital of $20,000 by J. M. Phillips, and others, plans operations on a 43-acre tract at Crider. The concern will install open mining machinery, including pumps, boiler, compressors, washer, etc.

Charleston, W. Va.—The Cass Hill Coal Co. has been incorporated with a capital of $50,000 to develop coal lands in Cass district, Monongalia County. The incorporators are Bernard J. Lynch, William F. Coal, Carl C. Hetzel, G. Howard Hetzel and Robert L. Stallings.

Charleston, W. Va.—The Big Bottom Coal Co. has been incorporated with a capital of $50,000 to develop coal lands in Malden District, Kanawha County. The incorporators are J. S. Cheyney, H. S. Cheyney, James Raisbeck, M. W. Raisbeck and T. S. Clark.

Birmingham, Ala.—The Phillips Mining Co. has been incorporated with a capital of $75,000 and will conduct mining operations at Sipsey, Walker County, Ala. The new operation is reached by a branch line from the Frisco which serves the Sipsey and Empire mines.

San Francisco, Cal.—A sum approximating $7500 has been collected by State Fuel Administrator Albert E. Schwabacher, from the retail coal dealers of the state for overcharging. This sum will be turned over to the National Red Cross, according to the plans of Mr. Schwabacher.

Clarksburg, W. Va.—The Diamond Fuel Co., of Clarksburg, has been incorporated with a capital of $50,000 to develop a coal area in Simpson district, Harrison County. The incorporators are J. Edgar Long, Carl E. Hornor, Charles B. Johnson, Wayne B. Hornor and Paul E. Reutter.

Charleston, W. Va.—The Ohio Valley Fuel Co. will have a small operation in Brooke County. The headquarters of the company will be at Wellsburg. The company is capitalized at $10,000 with J. K. Wells, Nera Wells, Lillian S. Wells, S. G. Wells and Millard Wells as incorporators.

Birmingham, Ala.—An interesting tabulation has been made by local coal interests showing the increase in production in the state during the past months. The weekly averages of coal production since April are: April, 353,409 tons; May, 371,268 tons, June, 371,214 tons; July, 406,233 tons; and August, 421,631 tons.

Charleston, W. Va.—Coal lands in Malden District of Kanawha County will be developed by the Buffalo-Kanawha Coal Co. of Buffalo, N. Y., which has taken out a West Virginia charter, with an authorized capital of $150,000. The incorporators are George Carson, E. E. Johnston, W. H. Farnsworth, M. E. Preisch and I. S. Given.

Henryetta, Okla.—The Block No. 1 Coal Mining Co. has been organized and charter has been filed with Secretary of State Lyon at Oklahoma City. The company is capitalized at $125,000 and will develop coal lands known as Block No. 1. The incorporators are Barclay Morgan, C. H. Lockhart and James Hepburn, all of Henryetta.

Charleston, W. Va.—A general coal mining, selling and shipping business will be done by the Sewlmont Coal Co., just chartered with an authorized capital of $150,000. This company was chartered by J. W. Graham, E. F. Graham, W. A. Charlton, C. B. Cottle and J. Q. Hutchinson. The company will have its operation in Fayette County.

Frankfort, Ky.—The Court of Appeals has recently handed down a decision of interest to coal interests in this section, in the case of the Lawrence Tierny Coal vs. Smith, guardian. The court holds that a minor's land may be leased for coal or other minerals by an order of the Court, but that such lease becomes void when the minor becomes of age.

Fayetteville, W. Va.—Organized with a capital stock of $300,000, the Sunrall Coal Co. incorporated by some of the leading citizens of Fayette County, will operate coal mines in that county just as soon as all Government requirements can be met. The incorporators are Dr. Gory Hogg, C. B. Hogg, C. W. Dillon, former State Tax Commissioner, J. P. Stevens and E. L. Nuckolls.

Newark, N. J.—A new coal briquet manufacturing plant to cost about $150,000 will be erected by the Burnrite Briquet Co., 142 Broadway, New York, on property at Alpine St. and Avenue A, recently acquired. The initial works will consist of a group of buildings for manufacturing, handling, loading, etc. The Mashek Engineering Co., 90 West St., New York, is engineer for the company.

Philadelphia, Penn.—The Lehigh Coal and Navigation Co. has awarded contracts to the Dodson Realty Co., Bethlehem, Penn., for the erection of a number of new homes for employees at its different properties. Ten double residences and a large boarding house will be constructed at Seek, Schuylkill County; and twelve double residences, each 2½ stories, 30 x 50 ft., will be located at Kaska Williams, Penn.

Birmingham, Ala.—Ammonia naphtha and other coke byproducts will be manufactured at Boyles, near here, by the Birmingham Coke and Byproducts Co. The plant will cost $3,000,000 and manufacture its products for use in the Government nitrate plant at Sheffield, the War Department having contracted for the output of the new plant. The daily consumption of coal will be 1000 tons with an output of 700 tons of coke.

New York, N. Y.—The Quigley Furnace Specialties Company, New York, has secured the contract for a powdered coal plant from the Whitaker Glessner Co., Beech Bottom Works, West Virginia, to furnish four tons of powdered coal fuel per hour to supply 20 furnaces for heating 6-in. shell forgings. This equipment is arranged for large extensions for future applications in other departments in the mills, including boilers.

Dallas, Tex.—Marked development of the coal mines in western Texas is reported as a direct outgrowth of the continued drouth throughout that section which has driven many of the farmers from their homes in search of other employment. Many of these drouth refugees are finding work in the mines in Young and adjoining counties, and a greatly increased coal output is now reported. Numerous new mines are being developed and operations are being carried on on a larger scale than heretofore.

Toledo, Ohio—A slight falling off in tonnage for lake shipment was noted during the week ending Aug. 31 as compared with some former weeks. The falling off is not considered serious, however. The Hocking Valley docks during the week mentioned loaded 180,878 tons as compared with 199,413 tons the previous week, making a total of 2,862,289 tons loaded for the season. The Toledo & Ohio Central docks during the same week loaded 81,000 tons as compared with 90,000 tons the previous week. The total for the season is 1,291,000 tons.

Buffalo, N. Y.—The Buffalo-Kanawha Coal Corporation has been organized here with capital stock of $150,000. The company owns mines in the Campbell Creek valley, near Charleston, W. Va. Six openings have already been made and coal is ready to ship as soon as the railroad spur is finished. The coal goes by barge down the Kanawha River after a short rail haul. Capacity of 500 tons a day is promised in six months. E. G. Johnson is president; G. A. Corson, vice president and manager; O. W. Davenport, secretary, and W. H. Davenport, treasurer, all of Buffalo.

Charleston, W. Va.—The annual meeting of the Kanawha Coal Shippers Association on Aug. 30 was featured by a banquet at the Kanawha Hotel, new officers being elected and the executive committee enlarged. The roster of officers and of the executive committee as now constituted is J. R. Thomas, of the Carbon Fuel Co., chairman; M. H. Tomb, secretary and treasurer. Executive Committee—J. R. Thomas, Quinn Morton, John L. Dickinson, J. C. Blair and F. B. Stewart, the last two being the new members of the committee. Voting to become affiliated with the West Virginia Coal Association, the Kanawha organization selected C. A. Cabell general manager of the Carbon Fuel Co., as a member of the executive committee of the State Association.

Seattle, Wash.—Judgment in the sum of $2,009,242, including $20,000 in attorney's fees, has been awarded by Judge C. M. Easterday at Tacoma, Wash., in favor of W. V. Rinehart, as trustee for Lindeberg, Inc., against the American Coal Co. and the Southwest Coal Co. as the result of action brought to foreclose on a mortgage given by the coal companies to float $1,500,000 bonds. The court has ordered the sale of the mines to satisfy the judgment. The property of the coal companies lies in or near Morristown, Wash. A review of the case shows that the American Coal Co. executed 3000 negotiable mortgage bonds on Mar. 1, 1912, aggregating $1,500,000, and to mature Mar. 1, 1942. The bonds were certified by the Seattle Trust Co., the trustee named, and are now owned by Lindeberg, Inc. The bonds provide for the payment of interest at the rate of 5 per cent. semi-annually, interest coupons being attached. The interest, however, was not paid, resulting in the foreclosure.

MARKET DEPARTMENT

Weekly Review

Production of Bituminous Not Equal to Demands—Whether Mines Will Make Up Deficit During Coal Year Depends on Railroads and Labor—Conservation and Curtailment Watchwords of Fuel Administration—Anthracite Output Breaks Record—Lake Shipments Show Betterment

THOUGH 1,586,000 net tons more of soft coal was produced during the week ended Aug. 31 than was mined during the corresponding week of 1917, yet the output for the last week in August just closed—12,642,000 net tons—was considerably below the mean requirements set by the Fuel Administration as necessary to meet essential needs. Again it must be emphasized that there will not be enough soft coal produced this year to satisfy all demands. Not only are nonwar industries being divorced from their fuel supply, but it is highly problematical if even the so-called war industries will be enabled to keep their fires burning with the intensity necessary to carry on their part of the recently magnified war program. Already more than 13,000,000 net tons behind for the coal year, the soft coal mines must produce at the rate of over 12,000,000 net tons a week for every week until Mar. 31, 1919, if the goal of 628,000,000 net tons of bituminous coal required to meet the country's needs is to be attained.

Are the soft coal mines equal to the task? The answer is both yes and no. Yes, if the railroads live up to the promise made by Mr. McAdoo that the movement of cars to and from the mines will suffer no delay in the future, and the miners labor efficiently for at least eight hours a day, six days a week. No, if Mr. McAdoo's promises of an improved car supply fail to materialize, as has so often proved the case in the past, or the miners lose sight of the larger national interests to further selfish ends by working half-heartedly, or only when the spirit moves them.

With the approach of cool weather also come recollections of the deplorable transportation conditions from which the country suffered last winter. Inadequate motive power, broken down rolling stock, poor track, depleted repairshop forces—why continue the harrowing details? The question is, Are the railroads in shape to meet similar conditions if they should arise this winter? It is like flying in the face of Providence to assume that the coming winter will be less severe than that of last year, as seems to have been done by the Railroad Administration to judge from recent statements emanating from that quarter. True, it is human nature to hope for the best, but at the same time it is the better part of wisdom to prepare for the worst.

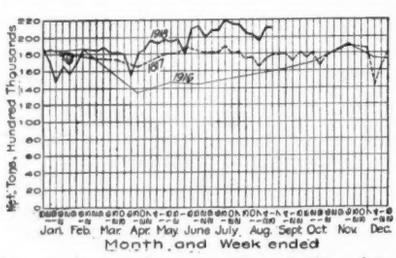
Unlike the Railroad Administration, the Fuel Administration deals only with actualities. It is going ahead constructively on the assumption that there will not be coal enough for all. The Fuel Administration is not attempting to fire the furnaces of the country's industries next winter with the empty promises of today. Curtailment and conservation are Dr. Garfield's watchwords, and underlying them both is the thought that war industries must not cease to function for lack of fuel. Toward the accomplishment of this end, fuel experts have been busily engaged in devising practical ways and means by which coal can be saved. For example, by the elimination of wasteful practices in the power plants of the country millions of tons of coal will be conserved. The domestic consumer, too, by means of pamphlets and other mediums, is being taught how to obtain the greatest efficiency from every pound of coal shoveled into the furnace, and sections of the country which had been under the impression that they could burn only certain grades of coal, which had to be shipped to them from distant mines, have been shown that they could burn with equal efficiency coal produced by mines which were at their very doors.

No such gloom as surrounds the bituminous industry is discernible in the anthracite region, though at this writing rumors of a strike in the anthracite field are rife. Undoubtedly a way will be found to settle or adjudicate the questions at issue in the hard coal region, as a let up in the production of anthracite at this time would result in suffering for a large majority of those who live on the Atlantic seaboard. During the week ended Aug. 31 a total of 2,259,715 net tons of hard coal was produced, which is the greatest output recorded during the present calendar year. During the period from April 1 to July 31, the actual distribution of the domestic sizes of anthracite virtually equaled the allotments made to the different states. The total production of hard coal for the coal year to date is estimated at 44,028,000 net tons.

Coal is moving to the lakes, for transshipment to the Northwest, in much better volume than heretofore. Shipments for August were 4,805,049 net tons, which is just under the mark of 4,900,000 net tons set by the Fuel Administration for the month. Thus far this season shipments to the lakes are approximately 1,089,000 net tons behind.

WEEKLY COAL PRODUCTION

The output of bituminous coal in the United States during the week ended Aug. 31 was approximately the same as the week preceding. Estimates place production during this week at 12,642,000 net tons, as against 12,620,000 net tons during the week of Aug. 24 and 11,056,000 net tons during the corresponding week of 1917. The average production per working day for week ended Aug. 31 is estimated at 2,107,000 net tons, an increase over the corresponding week of last year of 14 per cent. and over the average daily requirements for the coal year of 4.7 per cent. The schedule of the Fuel Administration, however, calls



for an increased rate of producing during the six months beginning with April, and production in the first five of these six months has been nearly 13,000,000 tons below this figure. To overcome ths apparent shortage it will be necessary to maintain the average daily rate of production during the seven months remaining in the coal year at 2,037,000 net tons, or 2.9 per cent., in excess of the average daily production in the five months, April to August. In the period beginning with the second week of June to the last week of August, the average daily rate of production has been approximately 2,061,000 net tons, compared with an average daily rate in the period from the first of April to the first of June of 1,864,000 net tons. It is thus evident that only by maintaining production at the level of the last three months through the good weather portion of the coming seven months of the coal year, will the estimated requirements be met. These figures of estimated requirements are based upon 628,000,000 tons for the year, divided between 52 weeks of six working days each, with no allowance for national holidays.

Reports from the carriers for the week of Aug. 31 show increased shipments of bituminous coal from western Pennsylvania, Cumberland-Piedmont and Somerset, Fairmont, Ohio, the district including northeast Kentucky, high-volatile of south West Virginia and smokless fields of West Virginia, the district including Iowa, Texas and Southwest States and from the Rocky Mountain and Pacific Coast States. Material decreases occurred in Tennessee and Kentucky where shipments declined 6.8 per cent. and in Alabama where shipments declined 6.4 per cent. Decreases also occurred in Central Pennsylvania, in Michigan, South West Virginia and the district including Illinois, Indiana and Western Kentucky. Compared with the corresponding week of 1917 all districts show improvement. For the coal year to date all districts with the exception of Michigan report shipments in excess of 1917.

Bituminous coal loaded on vessels at lake ports (including bunker coal) during the week ended Aug. 31, 1918, is estimated at 1,168,583 net tons, an increase over the week preceding of 1.5 per cent. and over the weekly average during July and August of 11.6 per cent.

New England shipments of bituminous coal, during week of Aug. 31, declined approximately 6 per cent. Receipts through the rail gateways declined slightly, while shipments from all harbors, with the exception of Hampton Roads, fell behind the performance during the week of Aug. 24. The current week's shipments, however, both by rail and tidewater, exceeded the weekly average during the coal year to date.

Shipments of bituminous coal from all North Atlantic harbors and Hampton Roads, during the week of Aug. 31, are estimated at 922,545 net tons, approximately 6 per cent. less than the shipments during the week of Aug. 24, but slightly in excess of the weekly average of the coal year to date. Shipments during the week, compared with the week previous, declined from all harbors, New York and Philadelphia falling behind 6 per cent. Baltimore 14 per cent. and Hampton Roads 5 per cent.

Beehive Coke—Production of beehive coke in the United States during the week ended Aug. 31 was estimated at 617,000 net tons as compared with 592,000 net tons during the week of Aug. 24, an increase of slightly over 3 per cent. The daily average during the current week is estimated at 103,000 net tons as against 99,000 during the week preceding. Operators in the Connellsville, Greenburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended Aug. 31 at 381,977 net tons and an operation of their plants at 75.1 per cent. of full time, as against 74.6 per cent. during the week preceding. Yard labor conditions improved slightly during the week.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Aug. 10	Aug. 17	Aug. 24	Aug. 31
Bituminous shipments, 123 roads	217,254	210,431	223,117*	222,814†
Anthracite shipments, 9 roads...	39,280	36,857	40,865	41,281

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Bradstreet's—Government buying and manufacture on war account make new records, but civilian trade reflects more irregularity, due to a combination of varying crop reports, more acute labor scarcity and increased and still growing difficulty in getting supplies of merchandise and of materials for the manufacture of civilian goods. Over and beyond this, also the new draft legislation, signed at the close of last week, is reported to have had the dual

effect of still further discouraging buying of men's apparel, and in some instances of causing closer scrutiny of credits by wholesalers pending clearer views of the extent to which their customers are likely to be affected by the raising of the draft age.

American Wool and Cotton Reporter—Apportioning of wool on any reasonable basis is likely to be exceedingly difficult. The questionnaire which has been sent out may be intended as a basis for equalizing the supply of raw material which the mills have available; that is, those who have a supply will receive a small apportionment, while those who have no supply will receive a relatively large apportionment. The cotton crop condition of 55.7 per cent. of normal was the feature of the week under review. Some feel that cotton will reach 40c. within a few weeks.

Marshall Field & Co.—In spite of the reductions effected by the price-fixing committee of the War Industries Board in the prices obtained by mills for their product, it becomes increasingly difficult to replace stocks of merchandise at prices prevailing last season either in piece goods or manufactured garments. Mills are looking for a higher basis of price to be announced Oct. 1 and are withholding their product in many cases in anticipation of being allowed a higher level to compensate for the recent rise in the raw cotton market and the increasing difficulty of their labor situation, which is reducing their output to a large extent. Road sales for current delivery were heavier than for the corresponding week in 1917. A few lines are now being offered for spring delivery and the orders indicate that merchants are eager to cover their spring requirements. Current shipments were largely in excess of the same period a year ago. Collections continue good.

The Iron Age—August pig-iron production fell below that of July. It was at a less rate also than the outputs of April, May and June, but was higher than that of any other month since May, 1917. The total was 3,389,585 gross tons, or 109,341 tons a day, against 3,420,988 tons in July, or 110,354 tons a day—a falling off in the daily rate of about 1000 tons. Furnaces in blast Sept. 1 were 372 with capacity estimated at 112,390 tons a day, against 363 furnaces on Aug. 1, with daily capacity of 111,300 tons. Leaders in the industry realize that even the present insufficient rate of production cannot be maintained unless special measures are taken in connection with the new draft. More important still is the maintenance of existing hours and the safeguarding of the industry for the period of the war against such restrictions of output as have commonly accompanied union control. The Lake Superior ore movement in August fell 934,000 tons below that of July, owing to the diversion of vessels from ore to grain.

Atlantic Seaboard

BOSTON

Flow of coal as yet undiminished, although radical reduction is now looked for. Still difficult to unload steamers. Hampton Roads situation causes anxiety and bottoms are in for detention. Byproduct coal again ordered west in heavy volume. Coastwise situation on bituminous is now reversed from what it was last spring. Fuel authorities at work on shutting off coal to plants having on hand more than the permissible stocks. All-rail movement expected therefore to be reduced materially. Expectation that movement to New York piers will be somewhat increased. Awkward situation continues with respect to Washington ruling as to limits for stocks in reserve. Gateways as yet show no falling off in bituminous, but figures will be closely watched the next fortnight. Anthracite screenings tonnage sags. Practically no spot market for the latter. Domestic sizes come forward about on August level. Slight improvement noted in movement of barges.

Bituminous—The second week of September shows no interruption in the flow of coal to New England. Steamers are still arriving from Baltimore and Hampton Roads faster than there is berth room to handle their cargoes promptly. There is congestion at all the railroad berths at Providence, Boston and Portland, and together with a general lack of labor at the wharves the awkward situation reported last week still continues. It is the judgment of the more farsighted in the trade that several of the ships now bringing coal here should be turned into other service temporarily, but naturally there is reluctance on the part of others to take such a responsibility. As far as can be seen now the ships will be needed in another 60 days or so if New England is to be supplied with anything like current requirements. Then, too, the recent taking of three large self-trimming colliers, their tonnage aggregating 17,000 tons, for over-sea service is an indication that the better class boats will be withdrawn from the trade in increasing numbers. The substitutes are slower, take much more time to discharge, and for that reason cannot be figured as a ton for ton replacement.

At Hampton Roads there is real reason for apprehension. At this writing the coal at Newport News and at the Norfolk piers aggregates only 65,000 tons, while there are steamers and other bottoms waiting to the extent of 178,000 tons. In other words, the expected has happened. A considerable volume of steam and byproduct coal has been ordered west and steamers are allowed to bunch at tidewater while someone is busy ordering the coal elsewhere. A lack of coördination is obvious and the trade is beginning to wonder when this will be remedied and New England consumers relieved of paying the bills to the tune of 25c. per ton per day. At Baltimore the outlook is relatively the same. The whole coastwise situation on bituminous is now entirely reversed from what it was last spring. At that time there was a real shortage of boats; today, if it must be said, there is a surplus of boats.

Meanwhile, under directions from Washington, state fuel administrators are working hard to see that coal is distributed equitably. At times, in the congested areas, it is more a question of getting it distributed at all, but the effort is being made to have deliveries withheld from those consumers who have more than seasonable reserves and to see that such coal as comes forward reaches only those whose low reserves justify further receipts. It is all a most difficult situation to administer. Coal pours in from several directions and no system of reporting could be really adequate. Tidewater distribution is easy to control but to divert properly at the gateways is a task beyond any machinery now in operation. It is impossible, under the conditions, to catch even one car in three.

One result of the weekly reports, however, will soon appear in the diminished volume of coal all-rail. So far the September receipts are on a parity with August, the August average having been 725 cars daily, including railway fuel. The District Representatives have now been advised what shipments to curtail and what to increase. The net result will be heavier movement to the New York piers to supply important requirements on Long Island Sound and inland in Connecticut. A better volume to the piers would also enable the Fuel Administration to send coal to ports all the way to Eastport, Maine, which the heavy movement of steamers from Hampton Roads to Boston and Portland has not been able to reach. The next problem will be whether the New York piers will be able to handle all the coal that will be sent in that direction.

Anthracite—The most prominent feature is the extent to which the tonnage of steam sizes has fallen off. The volume of bituminous coming forward has led many consumers to resume their former boiler-room habits, and undeniably the use of screenings has decreased the past month. Today there are practically no requests for barley or silt, and the spot market has all but disappeared. The difficulty of getting these coals forward during the winter has apparently been lost sight of.

As to domestic sizes, the receipts continue about on the August level. The average daily number of cars passing the New England gateways last month was 438, and the first few days of September showed that that level was being maintained.

The improvement in the movement of barges is noticeable, although only slight. The New York piers have thus far shown better results than was expected, although it develops that best results can be had by using both Philadelphia and New York for loading Reading barges. Otherwise the latter would almost certainly fall into delays.

The 30c. advance was effective Sept. 2 on domestic sizes, f.o.b. Philadelphia and New York. It seems to have caused not a ripple of comment, and as yet there have been no increases authorized in retail prices.

NEW YORK

Hard coal situation favorable. Consumers of bituminous well supplied. Little free coal.

Anthracite—In most of its aspects, the anthracite situation continues highly favorable. Production is heavy, and, after all, the fuel problem is more readily solved by a larger output than by the introduction of new methods of distribution and conservation. Official figures show that the high peak of the year was reached in the last week of August, when over 1,800,000 gross tons was shipped out of the hard-coal region. This was the largest weekly output during the present calendar year and was 214,000 tons ahead of the corresponding week of 1917. For the first time this year the average daily production exceeded 300,000 tons for a full week. That this was not due to any abnormal increase in washery output is indicated by the fact that almost precisely two-thirds of the tonnage consisted of domestic sizes, of which pea coal is now counted as one. This is about the average percentage as established by the records of past years.

Of course, the output was kept down last week by the Labor Day interruption, but it is to be noted in this connection that operations were not interfered with to so great an extent as usual, for the number of men who reported for work on Tuesday morning was in striking contrast to the number who, under the old order of things, were accustomed to show up on the day following a holiday.

The same tendency toward keeping the wheels turning with the least possible interruption was observed at this end of the line, for about 25 per cent. of the usual number of cars were dumped over the local piers on Labor Day and about the same number on the preceding Sunday. And with unusual large dumpings for the two or three days following, the week's record was a fairly good one.

The piers in the harbor handled 6713 cars in the week ending Sept. 6 as compared with 7358 cars in the previous week. Locally the hard coal problem has resolved itself, to quite an extent, into the matter of getting more stove and egg coal, particularly stove; of cleaning up the vast number of one- and two-ton orders and of taking care of customers in certain sections of Greater New York where the growth in facilities has not kept pace with recent increase in population. On none of the other domestic or steam sizes is there anything approaching the shortage in stove and egg. Broken coal has been in fairly good supply for some time past and there is no great complaint on the part of most retailers as to the current receipts of chestnut, although the situation varies materially in different parts of the city.

Pea coal is none too plentiful, but a good many consumers who formerly depended on this size have switched to No. 1 buckwheat. The latter size is now in very good supply, although shipments to tidewater are being regulated so as not to crowd the market too hard in view of the fact that its use is now restricted to apartment houses, hotels, office buildings and a few other classes of consumers. The shortage in rice coal has also been overcome except in the case of the highest grades, of which there is seldom enough to meet the demand in full. Barley and No. 4 buckwheat are in oversupply, but railroads have taken steps to see that shipments to the buyers are kept within bounds.

Current quotations, per gross tons, f.o.b., tidewater, at the lower ports are as follows:

Circular	Individual	Circular	Individual
Broken..$6.75	$7.50	Buck...$5.10	$5.90
Egg.... 6.65	7.40	Rice.... 4.65	5.10
Stove... 6.90	7.65	Barley.. 4.15	4.30
Chestnut 7.00	7.75	Boiler.. 4.60	
Pea..... 5.50	6.25		

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—In this immediate section, at least, a great many bituminous consumers are so well supplied that they have little cause for apprehension over the prospects for the near future. The greatest problem in the soft coal trade has to do with meeting increased demands from the steel industry, the Navy and the United States Shipping Board. These requirements involve the use of certain grades of coal, such as West Virginia smokeless and coking coals from western Pennsylvania, which do not figure in the New York market to any great extent.

Of the ordinary steam coals and low grade gas coals there appears to be enough to go around, even though these are being called for in greater volume by industrial consumers whose usual sources of supply are now shipping almost their entire output to the Shipping Board or to the Navy.

The new plan of supervising the storage of soft coal, so as to prevent some consumers piling up huge stocks while others

are unable to make reasonable preparations for the winter, promises to correct the situation which it was designed to relieve. Many consumers,, especially those not on the preference list, have more coal on hand at the present time than they are supposed to have, and in many cases further shipments to such concerns have been ordered discontinued. This has naturally made it easier for other consumers not so well stocked to round out their storage piles, so that by the middle of next month, when transportation troubles may be expected, there will probably be few concerns not reasonably well protected against any temporary interruption to deliveries.

For the last two or three weeks there has been a slight falling off in tidewater shipments of bituminous to New York harbor, which may be accounted for by the diversion of some coal to Baltimore and Philadelphia for transshipment by water to New England. The local piers handled about 1000 cars less of soft coal in August than in July.

In the week ending Sept. 6 the dumpings aggregated 6662 cars as against 6844 cars the week before. The difference is not marked, owing to the fact that operations were carried on at some of the loading ports on Labor Day and on Sunday of last week.

The up-turn in bituminous output recently recorded for the country as a whole, and the announcement that the central Pennsylvania mines turned out a record week's tonnage late in August, seem to confirm the belief that the midsummer decline in production was due to weather conditions interfering with the prompt discharge of cars at points of destination, rather than for any change for the worse on the railroads or as regards labor at the mines.

From the jobber's standpoint things have not changed much, except that tonnage contracted for comes along in better volume as output increases. There is still little coal to be picked up in the open market, the bulk of the shipments continuing to move through regular channels under arrangements entered into months ago.

Current quotations, based on Government prices at the mines, net ton, f.o.b., tidewater, at the lower ports, are as follows:

	Mine Gross	F. o. b. N. Y. Gross
Central Pennsylvania:		
Mine-Run, prepared or slack.....	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine.....	3.08	5.23
Prepared.....	3.36	5.51
Slack.....	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite settles down to busy routine. Consumers still anxious. Dealers experience trouble with labor. Local shipments better. Steam coals well taken, with an occasional tendency to weakness. Bituminous car distribution better. Local receipts fair. New distribution plan in effect.

Anthracite—All dealers have plenty of orders on hand and small stocks, and while the coal arrives somewhat slowly yet there seems to be an increasing steadiness and we hear little these days of teams standing idle, as was the case at times during July and August. The consumers, of course, are still anxious to have deliveries made and are keeping after their dealers with little let-up.

The dealers are anxious, naturally, to accumulate some coal in their bins, as ordinarily at this time of year their yards are quite full as contrasted with the present empty state. As a result they continue to harass the shippers, to whom they are prone to exaggerate their troubles. After a careful survey of the situation, and accepting the judgment of those high in the trade, we are more confident than ever that the severe trials of last winter will not be repeated. We are also of the opinion that labor shortage with the retailers will be the cause of more trouble than coal shortage. Dealers who have tried to speed up their deliveries by offering bonuses to their drivers for every ton over a certain number delivered each day, are not so sure that it is a wise policy. It proved satisfactory when the stock of coal on hand warranted overtime and extra effort to deliver. When the stocks dwindled and the same opportunities to make extra pay did not exist, then the yard help became dissatisfied and immediately asked to have their wages raised and this feeling still prevails.

The new price effective the first of the month caused practically no comment. The shippers did not announce the advance by circular and some dealers for a few days actually lost sight of the fact that coal was costing them more.

This week the anthracite distribution committee announced that they had accomplished their plan of giving a heavy advance tonnage to the New England territory and had actually exceeded the tonnage that they had hoped to place there during the summer. While good shipments are understood to be continued in that direction it is the general opinion that from now on this territory will begin to get every week a greater percentage of coal.

The retail men were again called upon the other day to furnish further details of their business to the local administrator. Mr. Lewis persists in being kept informed as to the number of tons of coal ordered, undelivered, in stock, and in transit to every yard in the city. The information is always forthcoming, but the trade with the short help does tire of the detail work involved.

The anthracite committee of the United States Fuel Administration is now sending to the producers and distributors the allotments by cities in the various states. There has been no particular interest aroused here as yet because they have not heard of the required tonnage to Pennsylvania: neither has New York or New Jersey been covered at this writing.

Broken continues to be consigned to the gas companies, public utilities and brass foundries, with little or none for domestic use. In order to see that these industries received the necessary amount of this size the authorities have recently apportioned the tonnage to the different shippers, as this is a size that must be made to order. Egg coal is comparatively free in the city proper and many of the smaller dealers have filled all their orders for it. In the outskirts, where the houses are larger and where most of the city's requirements for that size is consumed, the dealers continue to plead for it. Stove is by all odds in the shortest supply and by far the largest percentage of unfilled business calls for this size. The dealers claim it is still too early to persuade their trade to accept another size as a substitute. Chestnut is the next in proportionate demand, while pea coal is the easiest of the four popular family coals. The first cold snap is likely to change conditions and cause a quick demand for pea coal from the small buyer for small houses. Ordinarily all dealers were anxious for a large stock of pea with which to start the fall season.

Several shippers report a weakening in the steam sizes, noticeably on barley and culm. It is also true that fewer inquiries are coming in not only for these two sizes but on No. 1 buckwheat as well. The increased production of the washeries and dirt banks is having its effect there. Of course the cutting off of No. 1 buckwheat and the changing to bituminous by certain manufacturers is noticeable, especially as none of these sizes are yet in use for domestic heating purposes. There are some who predict that No. 1 buckwheat will be fairly easy before the end of the month, a condition, however, that is not likely to exist far into the season.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.25	Buckwheat..	$3.40	$4.45
Egg.....	4.80	6.15	Rice.....	2.90	3.80
Stove.....	5.05	6.40	Boiler.....	2.70	3.70
Nut.....	5.15	6.50	Barley.....	2.40	3.30
Pea.....	3.75	5.00	Culm.....	1.25	2.15

Bituminous—There has been a noticeable change for the better in bituminous lately. In fact during the last ten days the car supply has been running close to 70 per cent. of the present capacity of the mines. Many shippers, however, report labor conditions more acute than ever, as the men have a tendency to float around from one mine to another with the varying car supply.

With the entire production in the hands of the distribution committee these men are making the most of the production at hand. They have now arranged that all war industries shall have a 30-day supply, while those on non-war work have been put on a 15-day basis. As a consequence of this there is quite an accumulation of stocks all around this territory. While the local market in this way is being fairly well taken care of, it is understood that extra efforts are being made to take care of out-of-the-way places in New England. With the changed aspect in distribution many of the very largest plants who succeeded in getting from a 60- to 90-day supply are somewhat held back and they are skirmishing around to find means to continue the rate of stocking which they have enjoyed all summer. One plan is to send representatives into the region, which has been done to an increasing extent of late.

BALTIMORE

Bituminous situation continues fairly easy, but about one-third of the local tonnage continues to come in box-cars. Much coal of unsatisfactory grade. Hard coal men still lack tonnage. Apportionment for Maryland points announced.

Bituminous—Handlers of bituminous and officials connected with the local fuel administration report a fair tonnage now moving here. More than 1000 tons a day average for local use is now coming through. The heavy movement of coal in box-cars, which means both a greater initial cost and an extra cost for unloading, is an element of concern to consumers. This is the more pronounced as a considerable part of the coal coming in box-cars, as well as some of the fuel reaching here in open-top cars, is of most unsatisfactory grade. Baltimore has been particularly hard hit in the matter of good coal supply for industries outside of the war-industry and Government class, because of the fact that of the fuel left in this zone the Government has taken practically all the highest grade for its own use and has eaten heavily even into secondary coals. A considerable part of the coal reaching here outside of the tidewater pool on outside the capes movement is to the account of the Maryland Fuel Administrator and is being distributed by him to the most needy consumers through the purchasing agents, who file claims for coal.

Anthracite—Hard coal dealers here still lack the tonnage now being urgently demanded by consumers, many of whom have had orders in since April and May and have not as yet received even part of their expected tonnage. The fuel administrator is now compiling the August figures of tonnage received and distributed, and of orders still unfilled. At the outset of August there remained 322,725 tons of unfilled orders on the books of dealers. For April, May, June and July there was a total of 232,218 tons received here. The entire city allotment was definitely announced this week as 713,318 tons. This means that less than one-third of the city allotment was received here in the first four months of the coal year. As the allotment was fully 10 per cent. under the estimates of extra coal needed to meet war-industry demand and shortage in yards here at the outset of spring, it can be seen that the situation is far from assuring. The allotment announced for other Maryland points was as follows: Arlington, 17,244 tons; Annapolis, 15,000; Hagerstown, 14,585; Frederick, 11,601; Walbrook, 9671; Notre Dame, 7958; Chevy Chase, 6807; Cambridge, 6378; Catonsville, 6849; Bethesda, 6198; Easton, 6014; Havre-de-Grace, 6000; Towson, 5997; Chestertown, 5601; and Salisbury, 4936 tons.

Lake Markets

PITTSBURGH

Important cases of stocking coal discovered. Lake shipments behind. More allocations.

Investigations indicate that there has been more stocking of coal by consumers than was generally realized, but the stocking has not been uniform by any means, some consumers having nothing at all. The official ban upon stocking Pittsburgh district coal until after lake shipments are ended is as rigid as ever, and would be more rigid if the authorities had means for making it so. Production has increased slightly, except for the backset given by Labor Day, which was rather generally celebrated. The miners did not celebrate the day after as much as formerly, however. Lake shipments are decidedly behind schedule and are not picking up. The situation will probably make it necessary to continue shipments beyond Oct. 15, by which time it had been hoped the movement would be concluded. The period in which line consumers can stock up for the winter will be correspondingly reduced.

Allocations of coal are more frequent, and shipments are cut off now and then to consumers not recognized as essential, or who have stocks upon which they can draw readily. Brokers are doing scarcely anything. The market remains quotable at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged consumers by regular brokers.

TORONTO

Dealers overtaking delayed deliveries. Price of anthracite advanced. Possibility of curtailed allotments for Canada. Plenty of soft coal, but consumers must do delivery.

Coal is coming forward fairly well, and dealers are gradually overtaking orders in arrears. New orders are generally refused. The price of anthracite has been advanced 50c. per ton by most dealers owing to increased cost at the mines and additional freight charges, though some are filling orders on hand at the former price. The possibility of curtailed allotment for Canada is causing some anxiety, as it is feared that there may be a diversion of anthracite shipments to supply the New England States. The city authorities are considering the issue of an order stopping deliveries of hard coal to those consumers already partly supplied until those having none are supplied. Soft coal is readily obtainable by those who can provide for its delivery.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $11 to $11.50; pea, $10 to $10.50; bituminous steam, $9.25; slack, $8.25; domestic lump, $10.50; cannel, $13, wholesale f. o. b. cars at destination, three quarter lump $7; slack, $5.82.

BUFFALO

Bituminous rather quiet. Canadian trade not active. Supply not coming this way heavily. Anthracite local prices higher. Lake shipments fair.

Bituminous—Jobbers are finding it about as hard as ever to get a supply, especially since so much of the Pittsburgh coal has to go to the lakes. When that movement drops off this district ought to be better supplied. It is always that way in early fall, but when there is a real surplus the consumers are willing to wait. The fuel administration is now cutting off the local consumers who have a large amount stored up, but promising more when the supply runs down.

Bituminous prices have not been changed lately, being $4.65 for thin-vein Allegheny Valley, all sizes, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine run and slack, $5.65 for smithing and smokeless, and $6.10 for cannel, all per net ton, f.o.b. Buffalo. Most shippers prefer to sell at mine prices.

Anthracite—The demand is quite as active as formerly, but the supply does not increase, so the local distribution has fallen considerably below the former average. The fuel authorities say that the amount allotted to the city and county is sufficient and that the plan is to keep long-distance shipments up more closely than such as can be made with little additional expense in cold weather. An advance of local prices was made on the first of the month, the amount being 30 cents a ton on all sizes but grate and buckwheat, which are unchanged. The wholesale price to retailers is $7 for grate, $6.90 for egg, $7.20 for stove and chestnut, $5.75 for pea and $5.75 for buckwheat. The retail price to the curb is $1.85 more, with 50 cents additional to the man who houses it.

The shipments by lake appear to have been cut down by the holiday, being for the week 91,044 net tons, of which 44,100 tons cleared for Duluth-Superior, 14,344 tons for Milwaukee, 9600 tons for Sheboygan, 8600 tons for Marquette, 7700 tons for Fort William, 3200 tons for Green Bay and 3200 tons for Hancock.

CLEVELAND

Hopes that the closing of the lake season would make additional supplies of bituminous available in this district have been shattered by the semi-confidential information that the urgent coal demands of the Allies will compel the diversion of large tonnages to Buffalo and Pittsburgh. Ohio mines, however, are to be relieved of practically all of their railroad fuel, coal to come east from Illinois and Indiana for that purpose. Lake shipments in August set a new high record, but with Labor Day, labor seems to have ended its spurt and has proved more unsteady than at any time so far this season.

Bituminous—According to semi-confidential reports in circulation among operators here the Allies, particularly Italy, have made unprecedented demands upon the United States for coal. As a result, so the report has it, the lake season may arbitrarily be ended Nov. 15, or a large tonnage that ordinarily would proceed to the Northwest in late November and early December be held in the lower lake regions to supply domestic and industrial consumers. The lake season at an end, Ohio coal is to move east to Buffalo and Pittsburgh, and western Pennsylvania coal forwarded to tidewater. In order to make this movement as large as possible it is said that Ohio mines are to be relieved of the necessity of providing any railroad fuel at all, and already some operators are said to have received notice to forward their railroad fuel to the lakes, in anticipation of an eastward movement from Illinois and Indiana mines. This turn of affairs has not made operators feel any more optimistic concerning an adequate local supply this winter. Railroad fuel is quite an item with Ohio operators, since every New York-Chicago line crosses the state. The labor situation at mines in the No. 8 district of southern Ohio this week has been the worst of the season, due to the Labor Day hangover. At one mine employing a few over 500 men 91 were absent the day following the holiday. The reduced production, however, is said to be less than would seem probable, inasmuch as car supply has gone back to its steady gait. No industrials are getting any bituminous until operators are satisfied that their stocks do not exceed the Fuel Administration's maximum limits. Retail dealers are not getting one quarter, if that much, of the tonnage they could dispose of. The detailed report of the Pittsburgh Vein Operators' Association of Ohio on the car supply in August shows the average shortage for the month to have been 21.98 per cent. The best car supply was on Aug. 5, when it was only 8.18 per cent. short, and the worst on Aug. 21, when the shortage was 39.24 per cent.

Lake Trade—The Ore and Coal Exchange, Cleveland, which is conducting the pool of Great Lakes tonnage this year, reports that in August the lake fleet loaded 4,805,049 tons of bituminous, exclusive of bunker fuel. This is a record. In September, 1917, the fleet loaded 4,699,000 tons, the record up to August's performance. Since August was a 4,900,000-ton month on the Federal Fuel Administration's schedule, the season up to Sept. 1 is approximately 1,089,000 tons behind. Receipts at lower lake docks this week have been remarkably good, despite the Labor Day cessation at the mines and the attendant difficulty in getting back to the schedule. Tonnage is available plentifully so far this week, though in the latter part of last week the congestion at the ore docks held considerable back.

DETROIT

Shortage of domestic coal continues a harassing factor of Detroit trade. Anthracite supply is not improved. Lake trade is stronger.

Bituminous—Domestic coal users in Detroit received a sharp reminder of unfilled coal bins this week with a sudden drop in temperature and cold rain. Despite a slight increase in the proportion of domestic sizes coming into Detroit, the bituminous received is still chiefly mine-run stock, which is not suitable for satisfactory consumption in hot air furnaces and baseburners. Domestic lump and prepared sizes are not so plentiful as should be the case to provide for requirements of the many homes which will be unable to obtain anthracite.

In the effort to increase the supply for domestic use, manufacturing plants are instructed to obtain their coal supply from Illinois and Indiana mines. Quite a number of steam coal users, some of whom have had unsatisfactory experience with coal from those fields, are objecting to the substitution of what they regard as inferior stock for the West Virginia coal they have been accustomed to receive. Some have expressed a willingness, it is said, to close their plants rather than use coal which they assert would injure their furnaces.

Anthracite—Householders who are dependent on baseburners and who have been unable to place orders with retailers are making application to the fuel administration this week, through a clerical force in the Board of Commerce. Each home is permitted to order 3 tons, and the opportunity for placing orders will be terminated on Sept. 10. More than 5000 applications were received the first two days. Owners of hot air furnaces are to get no anthracite until those using baseburners are supplied. Meantime the movement of anthracite into Detroit is extremely light.

Lake Trade—Coal is moving over the lake routes in better volume than heretofore. August shipments were 4,805,049 tons, just under the mark of 4,900,000 tons set by the fuel administration for the month.

COLUMBUS

Special efforts still being made to supply the Northwest with fuel. As a result limited quantities are apportioned to the domestic and steam trade.

The Federal Fuel Administration is making every effort to supply the upper lake region with fuel before the close of navigation. Coupled with this movement is a demand from Michigan which is taking much of the available tonnage. Some coal is apportioned to the domestic and steam trades, but there is a shortage, especially in the former. Generally speaking, the tone of the trade is good.

Lake trade is moving along smoothly as far as vessel transportation is concerned. But shortage of cars and lack of motor power are reducing the output in practically every producing field of the state. Consequently some concern is expressed over the fuel situation in the Northwest. The movement of tonnage from the docks to interior points in the upper lake region is good and there is no congestion as in former years. Lake prices are still firm at Government levels.

Domestic trade is active, although limited receipts are holding up deliveries to householders. Retailers who had surplus stocks are in a position to take care of their retail trade. Some coal is arriving from mines which do not have lake shipping licenses. Pocahontas is now entirely out of the Columbus market and there is little anthracite to be had. The bulk of retail coal is supplied from Hocking Valley and West Virginia. Retail prices are firm at former levels, which takes into account the recent reduction of 5c. in most Ohio districts. A survey of the state shows that a larger amount of domestic coal has been stored than in any previous year.

Steam business is strong and the demand is firm. There is a considerable amount of screenings finding its way into the local trade, as many mines in the Hocking Valley are shipping prepared sizes to the lakes. The recent ruling curtailing storage of steam plants has produced a wider distribution of the available tonnage. Schools and public institutions are now fairly well supplied.

CINCINNATI

Increasing anxiety on the part of manufacturers to secure fuel features the market, but contracts depend upon Government's view as to whether operation is essential. Deliveries are good.

The coming of the first fall month has brought home to numerous manufacturers the fact that winter is just ahead, and their anxiety to secure an assurance of an adequate fuel supply, as well as for regular power consumption, is keener than ever. There has at no time been any cessation in the inquiry for industrial fuel, but of late this has assumed a more insistent note, due to the development in a number of cases that the Government was still to be shown that the industry in question was to be considered as essential. Several delegations of business men have gone to Washington to attend a series of conferences on this matter, and they hope to be able to secure definite classification of their several industries as essential, with orders to the Fuel Administration to give them listing that will entitle them to a regular supply of fuel. It has become self-evident that many manufacturing concerns will have to go on short fuel rations or none at all, and it follows that the available coal will go to those rated as indispensable. The volume of fuel going forward is large, but figures below the amount required to meet all demands. The Labor Day holiday, while in some instances dispensed with or only partly observed, none the less cut into production as usual, and while the following day's let-up was not expected to be as bad as formerly, on account of the prohibition laws prevailing, especially in West Virginia, the loss is felt. Domestic consumers are already well taken care of, although dealers are still after coal for current delivery.

LOUISVILLE

Better supplies of eastern Kentucky received. Stocking demand good on this grade. Western Kentucky stocking slowing down for present. Cold weather expected to bring late rush. Steam demand fair.

A better movement of coal has been experienced from the eastern Kentucky field during the past few days, although most of this coal is straight mine-run, the producers not screening under the present heavy demand from the lake region. Mine-run is taking care of the steam consumption, but is not producing the much needed lump for domestic stocking. Retail demand for eastern Kentucky lump is heavy, with dealers holding considerable orders for such coal provided they receive it and can make delivery.

At the present time domestic stocking on western Kentucky grades has slumped somewhat, and the dealers are well up on deliveries and managing to take care of

all inquiries. Production in both fields is fair considering the labor situation. Cars are in better supply than they have been for some time past, and shipments as a whole are standing up well.

Jobbers have been handling as much western Kentucky coal as they needed, but have been having trouble in securing eastern Kentucky grades, and some of the producers have been buying up the output of small mines to take care of their demand. Some of the jobbers have been handling small supplies of Indiana coal during the past few days.

BIRMINGHAM

Pressure for steam coal has eased off some, though the demand is still greater than the supply. Domestic trade strong, dealers having many unfilled orders on file. Production for past week will approximate 430,000 net tons in Alabama. Slackers continue to throttle the output.

Reports in trade circles indicate a little slackening of the pressure for steam coal, though ample business is offered and in hand to more than absorb the production. Otherwise there is no change of a material nature in local market conditions. There is no indication of any let-up in the demand for domestic coal, each succeeding month from Apr. 1 showing a substantial gain in coal deliveries by dealers over the preceding month. Receipts are inadequate to meet the abnormal demand at this season, and the yards are kept cleaned up.

Production at the mines in Jefferson County on Labor Day was fairly good. Reports from the Cahaba field indicate about a half normal output, while many mines in Walker County were idle the entire day, no men reporting for duty. Mines on the Southern Ry. suffered some from an inadequate car supply at times during the past week. Operations on other lines were not materially affected by car shortage.

Coke

CONNELLSVILLE

Operators trying to make better coke. In three months beehive coke production decreases much more than byproduct increases.

Efforts are being made to bring about steadier operation of coke ovens and more careful selection of coke, so that the poor coke some furnaces have been complaining of will be eliminated.

Production of pig iron in August was at a rate about 1 per cent. lower than the July rate, but this is attributed to high humidity of the atmosphere rather than coke conditions. Shortages of coke and cases of poor quality have been fairly regular, not distinguishing one month from another particularly. On the whole, however, coke supplies lately have not been altogether so good as three or four months ago. This fact is receiving the careful attention of the Fuel Administration and representations were made to the Railroad Administration some time ago.

The best coke production of the year, taking the country as a whole, fell in the four weeks ended May 18, when production averaged per week 683,000 tons of beehive and 481,000 tons of byproduct, making a total of 1,164,000 tons. In the four weeks ended Aug. 24 production averaged 589,000 tons of beehive and 535,000 tons of byproduct, a total of 1,124,000 tons. Thus there was a decrease in the total of 40,000 tons a week.

A more startling fact is that the production of beehive coke actually decreased by 94,000 tons, and the decrease of only 40,000 tons in the total was caused by the byproduct output increasing 54,000 tons. As new byproduct ovens were being completed in the past few months fears were entertained that they might draw so much coal from beehive fields as to decrease the output of beehive coke, but the development has been very much worse than that. The Connellsville region has practically a clear record in this matter, however, as while its beehive coke output may have decreased a trifle, it has been shipping much more raw coal than formerly.

The market is without incident, furnace coke being allocated before there is opportunity to offer it in the open market. Foundry coke continues to be offered rather freely, giving foundries an opportunity to stock. Set prices control furnace and foundry coke, at $6 and $7 respectively, crushed, over 3-in., being limited to $7.30. Carefully prepared material from old dumps, over 3 in., is bringing $6.75 for the best grades, for distribution to domestic consumers.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 31 at 338,250 tons, an increase of 545 tons over the week previous.

Buffalo—The situation is not materially changed. All furnaces in this territory are active, but they are so dependent on a scant supply of coke that their operations are in a sense curtailed by it. The byproduct ovens here are run at full capacity and they supply most of the needs of the district, so that the beehive districts are drawn on only in a moderate way. All breeze coke placed on the market is eagerly taken by jobbers, who as a rule sell it to regular customers at a moderate price. The iron-ore movement by lake continues heavy, receipts for the week being 337,400 gross tons.

Middle Western

MILWAUKEE

Hocking coal advanced in price to meet increased freight rates. Lake receipts of bituminous coal heavy. Conservation measures advanced.

Milwaukee coal dealers have been directed to advance Hocking coal 38c. per ton, beginning with Sept. 1, because of increased freight rates. Screened Hocking now sells at $7.93; pile run at $6.93 and lump at $6.68. A charge of 50c per ton is added when coal is carried in to bins. There have been no changes in prices of other grades of coal.

The month of August went over the top in regard to receipts of bituminous coal, and beat the record of any previous month. Cargo receipts of coal since May 1, when the docks were practically bare, were as follows:

	Anthracite Tons	Bituminous Tons
May	85,700	389,547
June	53,947	434,094
July	106,037	554 711
August	119,293	768,060
Total	364,977	2,146,412

September's record, including the first four days, foots up 3300 tons of hard and 82,656 tons of soft coal.

State Fuel Administrator Fitzgerald says Milwaukee is in no danger of a shortage of coal if proper economy is practiced. Householders are being instructed in furnace firing and an expert is supervising the conduct of power plants. The intent is to grant more coal to plants which are efficiently managed than to those where carelessness prevails. Essential war industries will be provided with a ninety day supply of coal. Nonessentials will have to take their chances with the fuel administrator.

The lightless order has been extended from two nights per week to four, beginning with the first week in September. Milwaukee country clubs will have to close their houses the coming winter, as they will not be allowed coal for heating after Dec. 1, and it is possible that surplus stocks in bins at these resorts will be taken over by the fuel administrator. Wood will be permitted, however, if it is not received by rail. At present summer cottagers on Wisconsin lakes are denied the use of anthracite for cooking purposes. Wood or soft coal only are permitted.

Some coal dealers find it difficult to compete for business in the present state of hide-bound regulation and have resorted to the practice of mixing poor coal with a better grade. The fuel administration office has given notice that any dealer found guilty of this kind of fraud will be denied the right to purchase coal.

ST. LOUIS

A quiet and slow market, with no demand from any source. No domestic business developing. Cars continue short on some roads and transportation shows slight improvement. Steam business quiet and a surplus of coal is on the market.

The situation is extremely easy in St. Louis. There is no demand for domestic coal other than that for Carterville, of which the supply still continues short. Steam business is unusually quiet. The steam plants do not seem to feel that they should store much coal ahead, and they are not storing any. Even the large public utility plants are not storing coal to the extent that the Fuel Administration desires, and up to the present the Terminal R. R. has no storage coal on the west side of the river. The Terminal was the cause of much trouble last winter, as it confiscated coal going to dealers and essential plants on account of its failure to store a sufficient supply, and it is not profiting by last winter's experience.

Business from the country is extremely quiet. There is a little domestic coal moving, but not in the volume that might be expected. In the Williamson and Franklin County field car shortage still continues somewhat severe, but transportation has proved better in the past week. Labor shortage is the cause of many mines making a poor showing.

A large tonnage of this coal still continues to go for railroad purposes and a small portion goes to the St. Louis market. In some sections in Missouri steam plants are using this coal that should use Standard or Mt. Olive, but lack of regulation permits this, and the same is true generally of steam plants in Illinois and Arkansas. Somewhat similar conditions obtain in the Duquoin field.

The Standard mines to a great extent have a surplus of steam sizes and in the past week No. 2 nut became heavy.

For two or three days there has been plenty of 2-in. lump coal. As a matter of fact, there has been more than the market could absorb, while 6-in. lump and 3 x 6 egg are in good demand at the Government maximum. Two-inch lump went down to $2.40, screenings are around $1.50, and mine-run is from $2.15 to $2.25. Car supply in a general way is somewhat better and transportation shows improvement.

The Standard field situation looks better. The railroad tonnage is good, and were it not for this the Standard mines would be idle on account of having no place to market their product. There are no eastern coals coming in and a light tonnage of Arkansas.

The prevailing market price per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
3-in. lump	.....	.....	2.25@2.40
2-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

General Statistics

ANTHRACITE OUTPUT FOR FOUR MONTHS

Figures showing the distribution of anthracite during the four months Apr. 1 to July 31 reveal that each of the New England States received tonnage in excess of its allotment, while the Middle Atlantic States, with the exception of Virginia, ran behind. In all cases, however, the departure from schedule, based on the 1916 distribution, was relatively slight and was accounted for in the main by the carrying out of the Fuel Administration's policy of favoring far-away sections in the early part of the coal year and making up the deficit in nearby states by heavier shipments later on.

Details are shown in the following tabulation:

State	Due on Allotment Apr. 1-July 31 Tons	Distribution Made Apr. 1-July 31 Tons
Maine	220,000	244,363
New Hampshire	125,000	141,022
Vermont	110,000	135,642
Massachusetts	1,896,332	2,102,466
Rhode Island	266,768	268,778
Connecticut	825,568	914,235
	3,443,668	3,806,506
New York	5,285,100	5,046,306
New Jersey	1,820,260	1,746,141
Pennsylvania	2,686,568	2,635,827
Delaware	81,952	74,450
Maryland	342,440	341,368
District of Columbia	221,932	219 429
Virginia	34,132	54,776
	10,472,384	10,118,297
Nine Central and Northwestern States	2,002,313	1,780,681
Canada	1,200 668	1,251,942